Farm Chemicals

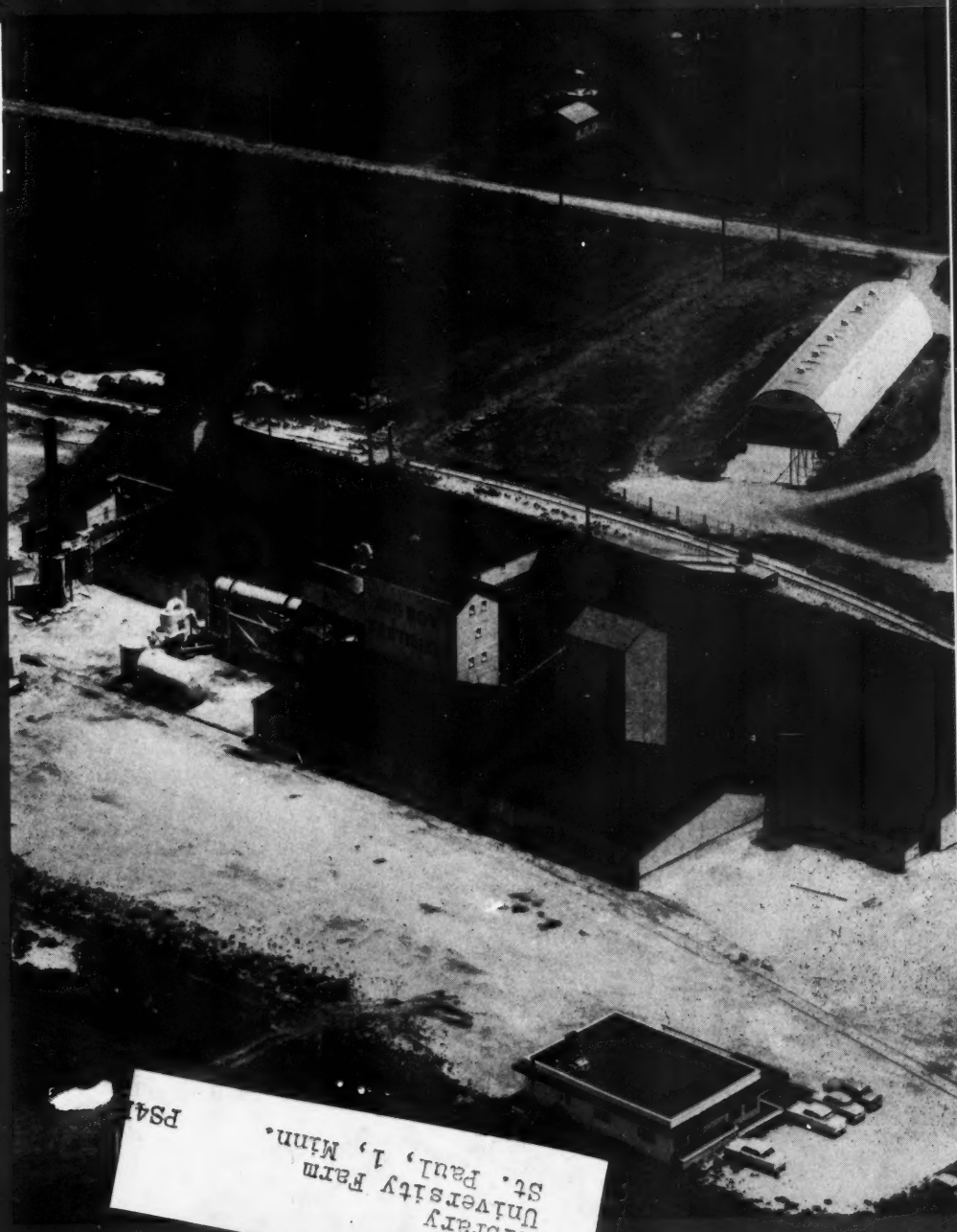
Pioneer Journal of the Industry

's 22nd Program 37

Seymour Process 38

Spraying Studies 43

ilizer Price Index 50



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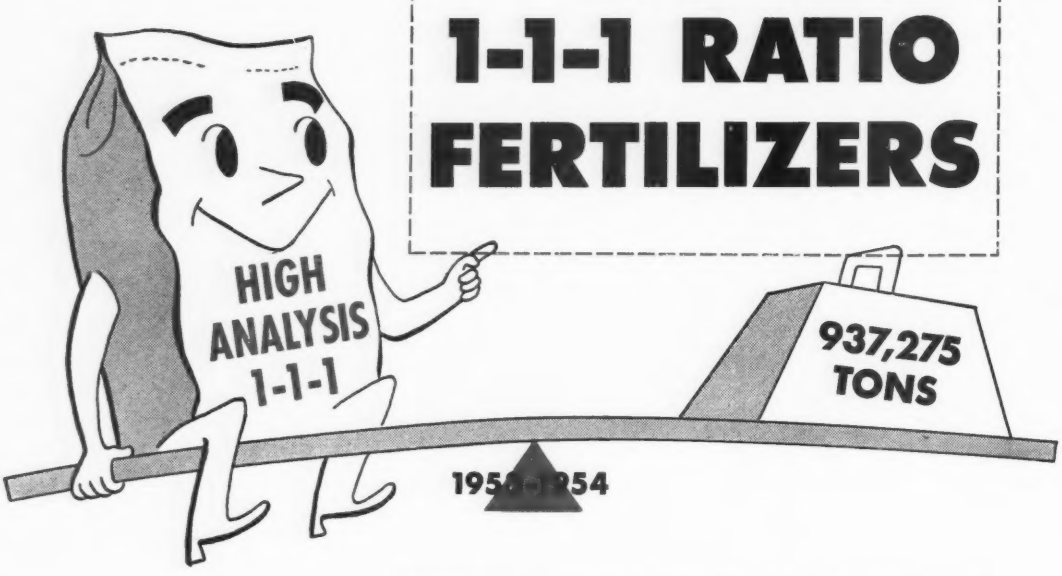
Vol. 118 No. 9 SEPTEMBER 1955 50 Cents

New tonnage records show the way to profits in 1-1-1 RATIO FERTILIZERS



Popularity of 10-10-10, of 12-12-12 and higher-analysis, balanced fertilizers keeps climbing, as more and more farmers find their heavily-cropped soils pay off better with more N-P-K plant food. The saving on bag-lifting with the concentrated new products also helps them sell faster.

Tonnage of 10-10-10 in 1952-53 was only tenth among mixed fertilizers. By 1953-54 it had already jumped to fourth place. In this one year's time, tonnage of 1-1-1 ratio fertilizer (10-10-10 or better) increased from 490,000 tons to over 937,000 tons.

Are you set for this growing 1-1-1 market that puts more profit as well as more plant food in every ton you sell? You can make better quality, faster curing, dustless, free-flowing 1-1-1 mixed goods with ARCADIAN® Nitrogen Solutions and ARCADIAN Sulphate of Ammonia. These economical sources of nitrogen also give you desired nitrate and ammonia balance. For details, see a Nitrogen Division technical service representative. His services are available to customers at no cost.

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Only these 2 completely new PAYLOADER® tractor-shovels offer you all these features

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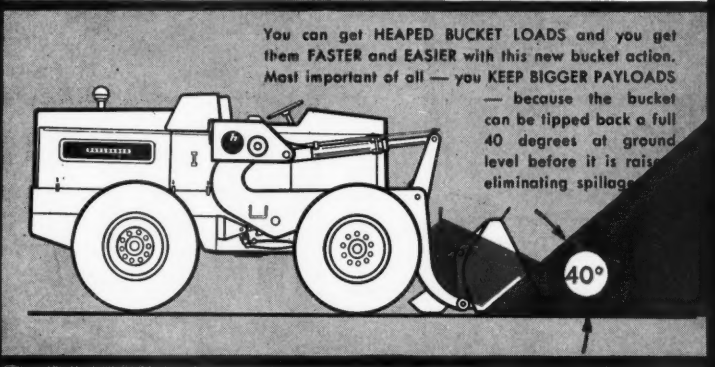
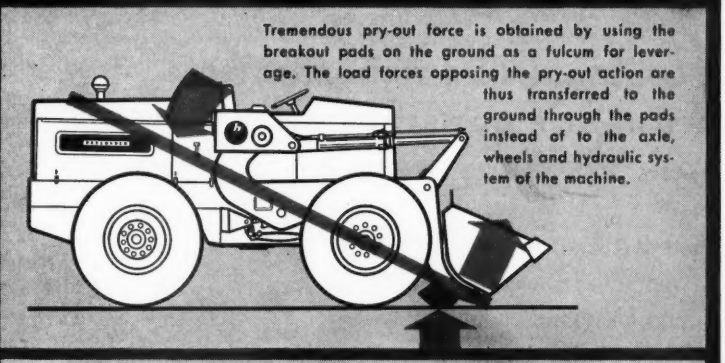
Model HH 1½ cu. yd.


You can get HEAPED BUCKET LOADS and you get them FASTER and EASIER with this new bucket action. Most important of all — you KEEP BIGGER PAYLOADS — because the bucket can be tipped back a full 40 degrees at ground level before it is raised, eliminating spillage.
40°

40 Degrees BREAKOUT at ground level with Tremendous pry-out action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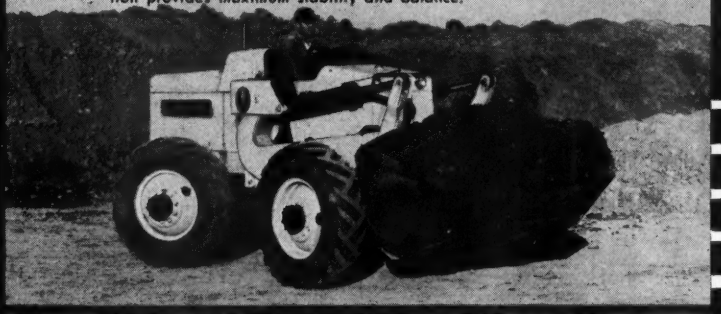

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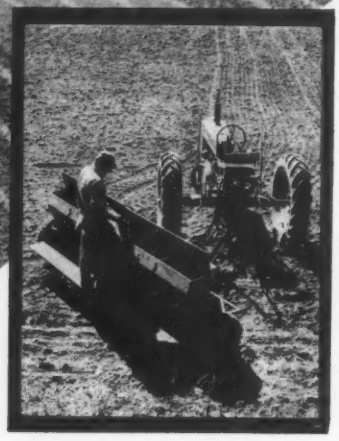

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The source of superior phosphate fertilizers for nearly 30 years, U. S. Phosphoric Products is your ideal source for quality and dependability in Triple Superphosphate. Your Bradley & Baker sales representative will be glad to help you plan your shipments for maximum satisfaction. *Call upon him today.*

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In this issue . . .

NAC's tentative program is covered on pages 36-37. This season's Spring Lake meeting includes another Miller Bill panel and special emphasis on research and economic trends.

Two of the Seymour process methods for high analysis plant food production are described on pages 38-40. Material was taken from a recent talk by James Seymour of Illinois Farm Supply who developed these methods of utilizing calcium metaphosphate.

Some interesting results from air spray distribution studies are included in an article beginning page 43. Based on a report by Fred M. Weick, it includes data on the effect of orifice diameter, airspeed and spray pressure on droplet size.

For an on-the-spot review of the Mexican fertilizer situation turn to page 47.

Maryland researcher Paul R. Poffenberger has issued a revised fertilizer price index, the first since November, 1952. On pages 50-51, figures for three selected years are presented showing comparable price indices for major plant food sources.

Also in this issue: picture page on Nichols Fert. & Chem., page 41; brief report covering a well received Great Plains NH_3 show and demonstration; initial work begins on Calspray's fertilizer units, page 49.

Cover story

Pictured is the Big Boy fertilizer plant near Wheatland, at Lenox, Okla., now operated by the Nichols Fert. & Chem. co.

Constructed in early 1952 by Oklahoma Fert. & Chem. co., it has an annual capacity of over 50,000 tons and serves a wide area with bulk and bagged plant foods.

Farm Chemicals

SEPTEMBER, 1955
No. 9
Vol. 118

Pioneer Journal of Farm Chemicals Industry, Est. 1894

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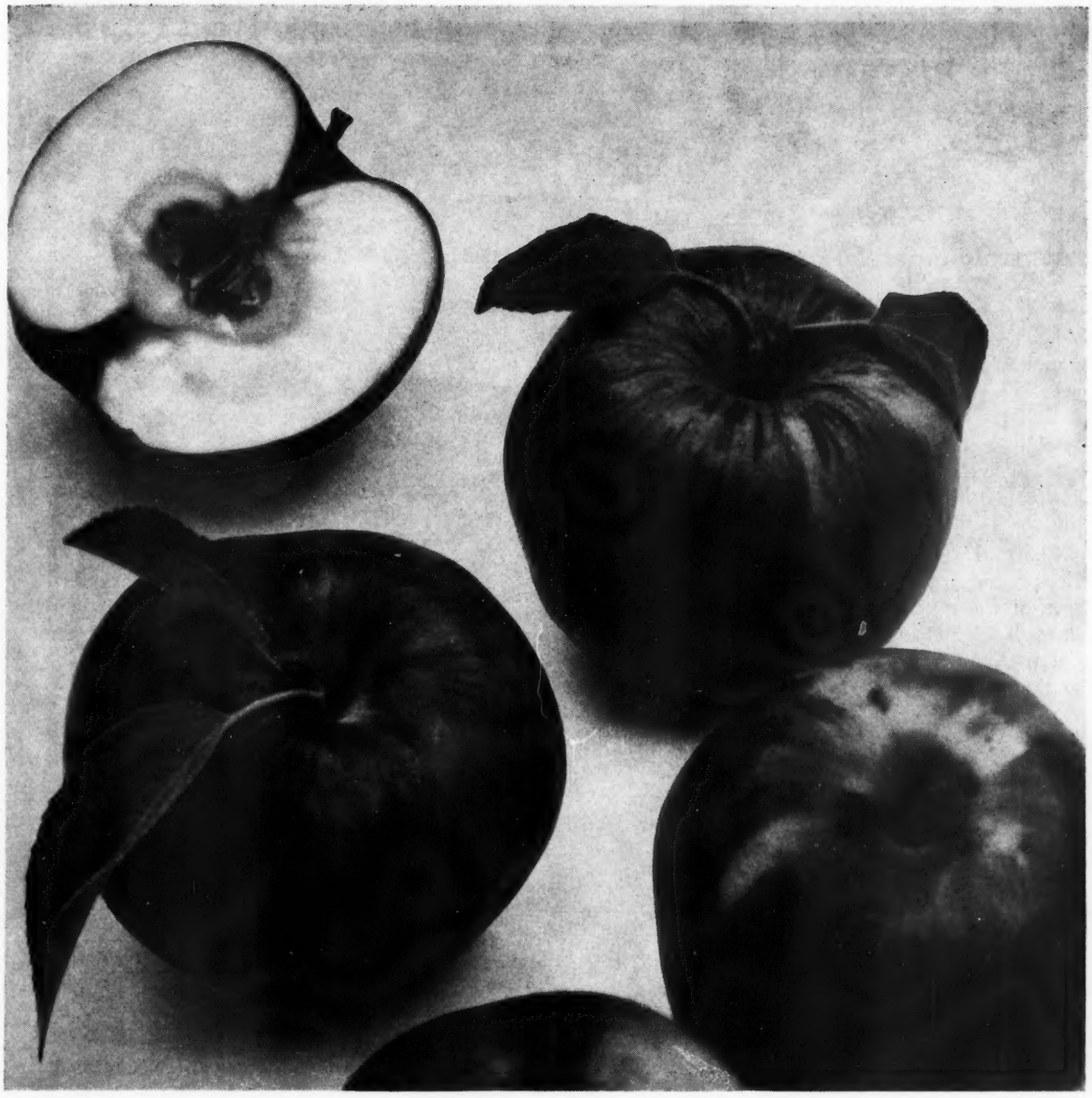

SWEET PROFIT-MAKERS

Big, red, juicy apples are not grown by accident. The use of modern commercial fertilizers is a calculated investment to bring in a better crop—and a better income for the grower.

Potash, a major component of modern commercial fertilizers, improves crop quality as well as enriching the soil, building crop resistance to disease and increasing total product yield. USP's high-grade muriate of potash is free-flowing and non-caking—important advantages in the production of fertilizers that help make the sweet-tasting apple make sweet profits for the grower.

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Business & Management

. . News of the Industry

Monsanto Plans '56 Formulation Sales

Next year Monsanto Chemical company's Organic Chemicals div. will begin marketing pesticide formulations under the Monsanto label in a 15 state mid-western area. The move places nearly all basic toxicant producers in the ranks of pesticide formulators.

Charles H. Sommer, Monsanto vice-president and general manager of the division, views sale through retail channels as beneficial to farmers and constructive to the farm chemicals business.

He states that "by bringing our company into a direct relation with the farmer through the products we obtain a quicker and surer grasp of farm problems that may be solved chemically." This, he added, will permit more accurate research and development efforts with quicker farm level access to new products.

Wholesale and retail distribution channels are now being set up for the brand name line which includes, to date, 18 herbicide, insecticide and crop desiccant formulations. Liquid products will be marketed in one, five, 30 and 55 gallon metal containers, dry materials in four pound cartons and 50-pound bags.

US Potash Expands Carlsbad Facilities

A $3 million expenditure has been approved by US Potash co.'s directors to increase the output of its mine near Carlsbad, N. M., and to expand its refining facilities to provide about 20 per cent additional productive capacity. It is expected that additional production will be available for the 1956-1957 sales year.

The firm also announced it has secured reservation of a large tract of Crown lands in the Province of Saskatchewan, Canada, for exploration of potash. A limited core-drilling program has been approved, although U. S. Potash reports the venture at this time is regarded as wholly exploratory.

Fire at Phila. Baugh

A four alarm fire at the Philadelphia plant of Baugh & Sons co. destroyed a glue bagging house, spread to another building in which superphosphate was stored and threatened other structures on the Baugh pier. Cause of the blaze had not been determined at press time.

New York Office For Atkins-Kroll

Atkins, Kroll & co. has opened a New York office in the Five Hundred Fifth Ave. building, with Edward Tolin, formerly in charge of the Los Angeles office, as manager.

Tolin

From New York, Tolin will market the materials now produced in increased volume by Badisch Analin & Soda Fabrik, A. G., Ludwigshafen, West Germany. Atkins, Kroll & co. for some time the Western distributors for these products under "Horse & Lion" brand, now will be exclusive US distributors.

Diamond Black Leaf Staff to Cleveland

J. W. Kennady, general manager of Diamond Black Leaf co., has announced transfer of the firm's headquarters staff from Richmond, Va., to new offices in the Union Commerce Bldg., Cleveland 14, Ohio.

The move is part of a long-range program designed to coordinate more effectively the manufacture and marketing of its pesticide lines and, said Kennady, "will enable our organization to provide better service on a nationwide basis to Diamond Black leaf distributors and dealers."

Product development and research activities remain at Richmond, site of a district sales office and one of four formulating plants.

Construction Begins On New Iowa Plant

Continental Fertilizer co., recently incorporated in Iowa by a group of Nevada, Ia., business men, has started construction of a plant in that city for the manufacture of liquid, dry and nitrogen fertilizers. Including machinery and equipment, the plant represents an investment of about $200,000, and is expected to be ready to start production in early September.

Froot Heads MGK's New York Branch

Opening of an eastern office at 21 East 40th St., New York City 16, to handle sales in the New England, New York and Middle Atlantic areas has been announced by McLaughlin Gormley King co. Nathan D. Froot, formerly with the Pesticide Advisory Service and Propel Chemicals, has been named manager of the new branch.

MGK's New York phone number is LExington 2-4115.

International's New Triple Superphosphate assures more

complete ammoniation

ONE look shows you why International's new Triple Superphosphate offers such a big advantage in ammoniation. Its improved fineness of texture; uniform, dust-free particles; and correct chemical structure assure maximum ammoniation in minimum time — help cut your manufacturing costs. International's new Triple Super is made by an improved process from high quality rock. Result: a high analysis product (46% A.P.A. or better). Special conditioning before shipment helps prevent setting up en route. This, plus improved particle size, means less grinding before mixing, more economical handling, better texture in your finished products and high product performance. International's new Triple Super is ready for immediate delivery to your plant. Write or wire the Phosphate Chemicals Division for samples and quotations.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

. . . Business & Management

Nicotine Sulfate Imports Probed

An investigation by the Tariff commission has been launched, on recommendation of the Treasury dept., to determine whether domestic producers of nicotine sulfate have been injured or are likely to be injured by imports at less than fair value.

The move came as a result of findings by the Treasury that a Dutch importer, N. V. Alhamex, Amsterdam, has been making such shipments.

Research, Control Lab for Berkeley

A new research and control lab will be completed this month by Berkeley Chemical corp., manufacturing affiliate of Millmaster Chemical corp., adjoining a new auxiliary warehouse for storage of finished products in the high-priced range.

The new, single story structure will contain more than 5,500 square feet of useable space, of which more than half will be devoted to research and control laboratory facilities.

Cornwall Enlarges Acid Facilities

Cornwell Chemical corp. has announced plans for additional sulfuric acid facilities at Cornwells Heights, Pa.

Following completion of the new plant, Cornwell believes it will have the largest production of all grades of sulfuric acid and oleums for sale in the Delaware Valley.

International Unit Formed by Velsicol

Velsicol International corporation, C.A. has been formed by Velsicol corporation to handle expanding foreign trade activities in sales of technical chlordane, heptachlor, endrin and other products.

Collinsworth

E. T. Collinsworth, Jr., has been named president of the new concern and will retain his post as vice president and general manager of the parent company. Headquarters will be in Chicago with a branch office in New York.

New Program for Personnel Evaluatian

A new program for evaluating employees, "The Performance Record," based on what employees do rather than on subjective supervisory opinions, has just become available from Science Research Associates.

The Performance Record uses a new approach to evaluating employees, the "critical incident" method in which supervisors look for the significant actions, which result in success or failure of the employee on a part of his job.

After research with hourly, salaried and supervisory personnel in industry, the Record was constructed by Dr. John C. Flanagan and Dr. Robert Miller of the American Institute for Research.

Chemical Enterprises Moves NYC Offices

Chemical Enterprises, Inc., has moved its offices to 60 East 42nd Street, New York City 17. Telephone number: MUrray Hill 7-3545.

NPFI's Strawberry Bowl

Governors of Washington and Oregon, Arthur B. Langlie and Paul Patterson, have accepted a challenge on behalf of their farmer constituents as to which state is the best strawberry producer. Dr. Russell Coleman, National Plant Food Institute exec. vice pres., and Delbert L. Rucker, director of publications, display the "Oregon-Washington Strawberry Bowl" the institute has provided for presentation to the winner at the annual Oregon State Horticultural Society banquet on Dec. 1.

Five Settlements In Florida Strike

Late in August, F. S. Royster Guano co. became the fifth Florida phosphate operator to sign an agreement with the ICWU. Three concerns, International Minerals & Chemical corp., American Cyanamid co. and U. S. Phosphoric Products, were still strikebound.

Royster workers received a package deal offering an 8.58 cents/hour increase with four cents additional beginning July 1, 1956. Comparable deals were previously announced by American Agricultural Chemical co., Armour Fertilizer Works and Virginia-Carolina Chemical corp. Coronet Phosphate was the first to settle (FC 8/55, p. 7).

Gates were opened at International mines and plants in mid-August with a few resultant incidents and the filing of an injunction suit against mass picketing by the ICWU. On the first day operations were resumed pickets overturned a station wagon carrying a photographer and reporter, threatened to upset another and were accused of hitting several cars with clubs.

Testifying before a circuit judge in Bartow, unionists denied charges, company witnesses cited dents and traffic stoppages.

Chlordane Pushed In Roach Drive

"It's no disgrace to have roaches, but it's a disgrace to keep them," is the underlying theme in the present 10-state program designed to help residents say "Goodbye, Mr. Roach."

The program is being conducted through offices of state agricultural extension services with the approval of USDA.

Cooperating with the participating states, Velsicol corp. has been encouraging insecticide formulators, distributors and dealers in the area to tie in with the campaign. In addition to helping the extension service stimulate interest in the campaign, commercial companies, reports Velsicol, can also cash in on this excellent sales opportunity. Velsicol has made available to distributors and dealers a complete assortment of Chlordane merchandising aids for the campaign.

Got Screening Problems?
Here's The Answer!
Ludlow-Saylor
WOVEN WIRE SCREEN
• Precision screening guaranteed! Precrimping and stress-free weaving eliminate distortion of openings.
• Unequalled resistance to abrasion, set and fatigue! Laboratory-developed, job-tested alloys wear longer, give more tonnage per screen dollar.
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• 99 years of know-how! The pay-off for you is in greater dependability, longer service and unusual durability of Ludlow-Saylor screen sections.
• Fast shipment! Most popular sizes and weaves shipped from stock, saving time and cost.
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A Data Book and Screen Selector full of helpful information and tables. Exclusive fast reading feature shows at a glance sizes and weaves ready for shipment from stock. Write today!
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West Coast: Star Wire Screen & Iron Works, Inc., 2515 San Fernando Rd., Los Angeles;

Garfield Planning Acid Expansion

Garfield Chemical & Manufacturing co. is reported planning a multi-million dollar expansion that would add between 250 and 300 tons of output daily to a total of about 1,000 tons sulfuric acid.

The firm is jointly owned by Kennecott Copper corp. and American Smelting & Refining co.

Record Number of Personnel Workers

The number of persons employed in personnel work in proportion to total company employees has hit a new high, according to this year's survey of personnel ratios and salaries conducted by Dale Yoder and Mona L. Walz of the University of Minnesota Industrial Relations Center. Results of the study are reported in the July-August issue of *Personnel*, professional journal published by the American Management Association.

Average personnel ratio (number of staff members in personnel and labor relations per 100 employees) hit a record high of 0.87 in January and February, an increase of more than a third over last year's 0.65.

Also at its highest level since the survey was begun eight years ago is the average annual salary of the executive in charge of company employee relations—$10,530, a 6 per cent increase over last year's $9,932. Median salary increased from $8,631 in 1954 to $9,393 in 1955, a jump of 8.8 per cent.

Work Break

The text of a small card prepared by Bolden & co., Akron, Ohio and addressed "To All Employees," reads as follows:

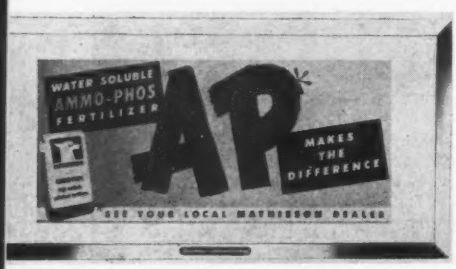
The text of a card prepared by Bolden & co. and addressed "To All Employees," reads:

"Due to increased competition and a keen desire to remain in business, we find it necessary to institute a new policy—effective immediately. We are asking that somewhere between starting and quitting time and without infringing too much on the time usually devoted to lunch periods, coffee breaks, rest periods, story-telling, ticket-selling, vacation-planning and the rehashing of yesterday's TV programs, that each employee endeavor to find some time that can be set aside and known as the "WORK PERIOD."

Outdoor Ads Spark O-M Fertilizer Drive

Olin Mathieson's Agricultural Chemicals div. is giving its new "AP" product symbol top emphasis through its current 24-sheet poster campaign in farm centers and along rural highways in the South, Southwest and Middle Atlantic states.

Since its initial use of the medium in 1952, OM has increased its annual outdoor appropriation six times, reports Outdoor Advertising, Inc. Doyle, Kitchen & McCormick, Inc. is the agency.



N. C. Pest Control Commission Named

Appointments to North Carolina's Structural Pest Control Commission, a new agency authorized by the 1953 General Assembly, have been announced by Governor Hodges.

Named to the five-member commission are Rep. I. H. O'Hanlon, Fayetteville; Walter Wilson, Winston-Salem; Dr. D. L. Wray, State Dept. of Agriculture, Entomology div.; Dr. Clyde Smith, head, N. C. State College, Entomology dept., and John L. Reitzel, assistant commissioner of agriculture.

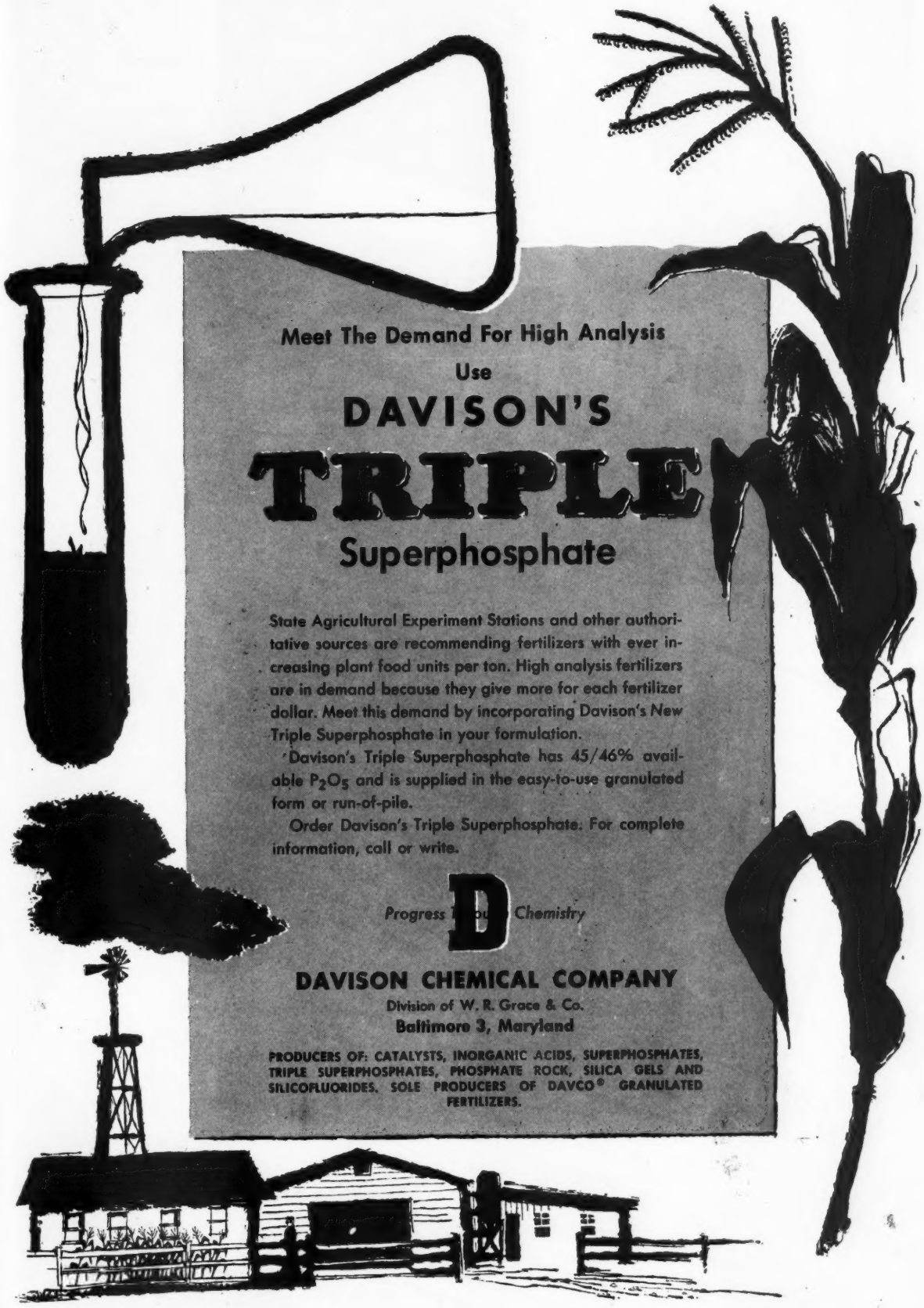
All persons engaged in structural pest control are required to obtain a license from this commission, after passing an examination on their qualifications for such work.

Basic qualifications set by law are: (a) two years as an employee or owner-operator in the structural pest control field; (b) one or more year's training in specialized pest control, each year of which may be substituted for one-half year of practical experience; or (c) a degree from a recognized college or university with training in entomology, sanitary or public health engineering or related subjects; and (d) experience and knowledge of practical and scientific facts underlying the practice of structural pest control.

June-July Safety Report from S-D

No lost time accidents during July and only one in June have been reported by Smith-Douglass co.

During the first six months of 1955, the company worked 1,510,643 man hours with nine lost time accidents and an accident frequency rate of 5.96.


Meet The Demand For High Analysis
Use
DAVISON'S
TRIPLE
Superphosphate
State Agricultural Experiment Stations and other authoritative sources are recommending fertilizers with ever increasing plant food units per ton. High analysis fertilizers are in demand because they give more for each fertilizer dollar. Meet this demand by incorporating Davison's New Triple Superphosphate in your formulation.
Davison's Triple Superphosphate has 45/46% available P_2O_5 and is supplied in the easy-to-use granulated form or run-of-pile.
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Mineralized FERTILIZER

THE *Easy* WAY WITH TC TENNESSEE CORPORATION

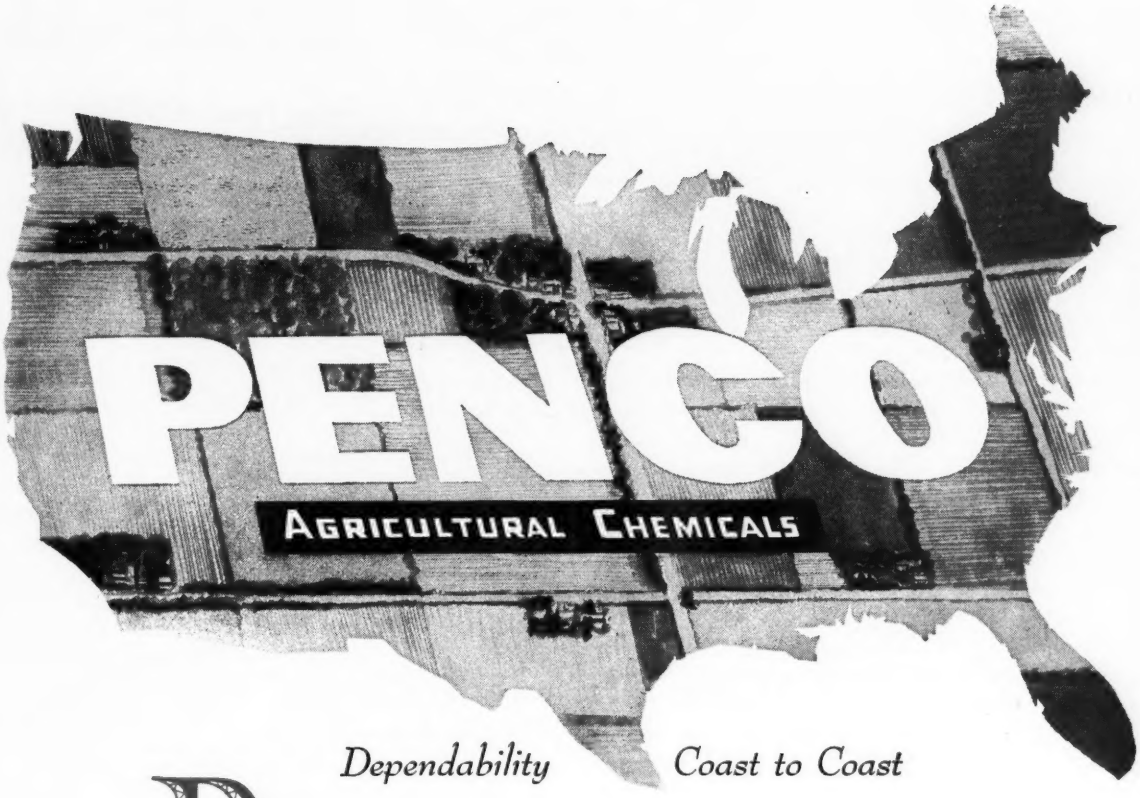
Custom Formulated MINERAL MIXTURES

For a completely balanced plant food there's now only one additional ingredient to add — *Tennessee's Custom-Formulated Mineral Mixtures* — no additional labor or mixing facilities are required — we custom mix any combination of minerals to your own specifications — *Tennessee's Custom-Formulated Mineral Mixtures* come to your plant in bulk or bag already carefully mixed in controlled amounts of soluble, readily available forms of copper, manganese, iron, zinc, magnesium and boron — you reduce material cost handling time and number of items purchased with *Tennessee's Custom-Formulated Mineral Mixtures.*

Samples, specifications and detailed information upon request.

TENNESSEE CORPORATION

617-629 Grant Building, Atlanta, Ga.



Dependability *Coast to Coast*

PENCO sprays help protect the fruit crops and the forests of the great Northwest. In Maine and Idaho, better potatoes grow with the aid of Penco potato insecticides. From California to the Carolinas, cotton quality is improved by use of Penco cotton insecticides and defoliants. In the Middle West, Penco herbicides help produce weed-free crops, and livestock producers depend on Penco dips and sprays. In short, you'll find Penco products practically everywhere.

PENNSYLVANIA SALT MANUFACTURING COMPANY OF WASHINGTON

TACOMA 1, WASH.

Pennsalt Chemicals

Aurora, Ill.; Philadelphia, Penn.; Berkeley, Los Angeles, Calif.; Montgomery, Ala.; Bryan, Texas; Portland, Ore.; Yakima, Wenatchee, Washington

. . . Business & Management

Gas Line, Financing For Nitro-Chemicals

A permit has been issued by the Alberta Conservation Board for construction of a 10-inch, 46 mile gas pipeline from the Etzikom gas field to Medicine Hat, Alberta, site of the projected $22 million chemical plant of Northwest Nitro-Chemicals, Ltd.

Nitro-Chemicals has been granted permission by the board to use the gas until 1976. Initial deliveries will exceed 12 million cubic feet daily.

The company is now seeking registration of $8.5 million of 10 year subordinate income debentures, series A and B, due 1965, and 850,000 shares of its one per cent common stock to be offered to the public in units of $50 or debentures and five shares of stock.

New ICI Offices

Executive offices of Imperial Chemical Industries (New York) Ltd., are now located on the 19th floor at 488 Madison Avenue, New York City 22. Telephone number: MUrray Hill 8-1430.

Steel Drum Rules Adopted by MCA

Recommended universal standard specifications for steel shipping containers have been adopted by the Manufacturing Chemists' Association's Metal Packages committee, the Steel Shipping Container Institute reports.

These container types are covered: 55 gal.; tight-head drums under ICC 17E and Rule 40; 400-lb./55-gal., full-removable head drums under Rule 40; 30-gal., tight-head drums under ICC 17E and Rule 40; 120-lb./16-gal., full-removable-head grease drums under Rule 40; 16-gal., tight-head drums under Rule 40; 5-gal., tight-head pails under ICC 17E and Rule 40; 5-gal./35-lb., lug-cover pails under ICC 37A and Rule 40.

The 'Typical' U.S. Production Foreman

The "typical" American production foreman earns $6,241 a year, according to a survey of foremen's compensation just released by the American Management Association's Executive Compensation Service.

Conducted from December, 1954, to February, 1955, the survey covered 6,500 foremen in more than 100 companies in various sections of the country. From its results emerged the following profile of the "typical" foreman:

He is 45 years old and has been on his present job 8½ years; supervises 42 hourly workers. Last year his salary was raised by 6.3 per cent; 66 per cent received raises in 1954. He may or may not have received a bonus; bonuses were paid last year to 40 per cent of the durable-goods-industry foremen included in the survey.

Joint Venture for Col-Southern, ICI

Columbia-Southern Chemical corp. and Imperial Chemical Industries Limited of London, England, have submitted a joint application to the U. S. Government for a contract under which the Government would purchase 5,000 short tons a year for five years of granular titanium metal.

If a contract is awarded, the two firms will form a jointly owned subsidiary to produce titanium metal by ICI's sodium reduction process.

CONSTRUCTION

Three Firms Add Granulation Units

Three fertilizer producers recently announced plans for new granulating facilities, and work is already well underway at one location, Buhner Fertilizer co.'s Danville, Ill., plant.

Before the end of 1955, Kingsbury & co. will be granulating at Peru, Ind. According to Geo. H. Kingsbury, president, the facilities "will manufacture at a much higher rate than any in operation today, to the best of our knowledge."

By August 1st, building modifications were finished at Fostoria, Ohio, site of a new plant for Ohio Farmers Grain & Supply assn.

Design and equipment for the first two and a granulating plant for the third are by the D. M. Weatherly co.

U.S. Steel Begins Geneva NH_3 Plant

Engineering is underway and construction will soon begin on anhydrous ammonia facilities at the Geneva works of U. S. Steel's Columbia-Geneva Steel div., near Provo, Utah. The 200 ton per day plant will be the first domestic installation in a major steel mill to use raw coke oven gas as a hydrogen source.

Blaw-Knox's Linde low temperature separation process will be used for hydrogen recovery and to extract nitrogen from the air, its Montecatini process for ammonia synthesis.

The project also includes a nitric acid plant and a prilling process fertilizer-grade ammonium nitrate unit for solid and liquid forms.

The Chemical Plants div. of Blaw-Knox is designing and will build the plants.

CSC

ANHYDROUS AMMONIA
82.3% N

The most economical and concentrated source of nitrogen available as a plant food. As a fertilizer it is applied directly to the soil and through irrigation. It is widely used by the fertilizer manufacturer for ammoniating superphosphates and as a basic source of N in combined plant-food forms.

AQUA AMMONIA

Convenient form of nitrogen for high-analysis formulations and acid oxidation. Nitrogen content approx. 20% in most widely used grade. Various concentrations available to suit your special need.

NITROGEN SOLUTIONS
CSC 101 – 40.6% N
CSC 102 – 40.8% N
CSC 103 – 37.0% N

Nitrogen solutions provide the lowest cost and most efficient media for quick curing of superphosphates. They supply more total N than any other ammoniating media. CSC Nitrogen Solutions offer the fertilizer manufacturer a wide range of physical properties to meet all requirements.

CSC AMMONIUM NITRATE FERTILIZER 33.5% N

New, crystalline form made by CSC's exclusive process. New process assures low moisture, free flow, and excellent handling and storage characteristics. CSC Ammonium Nitrate Fertilizer is going to the farmer through leading fertilizer manufacturers.

AGRICULTURAL CHEMICALS

COMMERCIAL SOLVENTS CORPORATION

260 Madison Ave. New York 16, N. Y.

you are looking at the

FIRST LOW-COST PRACTICAL LIQUID FERTILIZER APPLICATOR

IS THIS A "ONCE IN A LIFETIME" OPPORTUNITY FOR YOU? . . .

"YOU BET IT IS . . . and the facts prove it! Liquid fertilizer is the coming thing in modern farming. Almost every farmer is a prospect—because it saves him time, money and back-breaking hard work. The only drawback has been the high cost of practical applicator systems. The picture shows you the answer . . . the Krause-Liberty hose pump applicator.

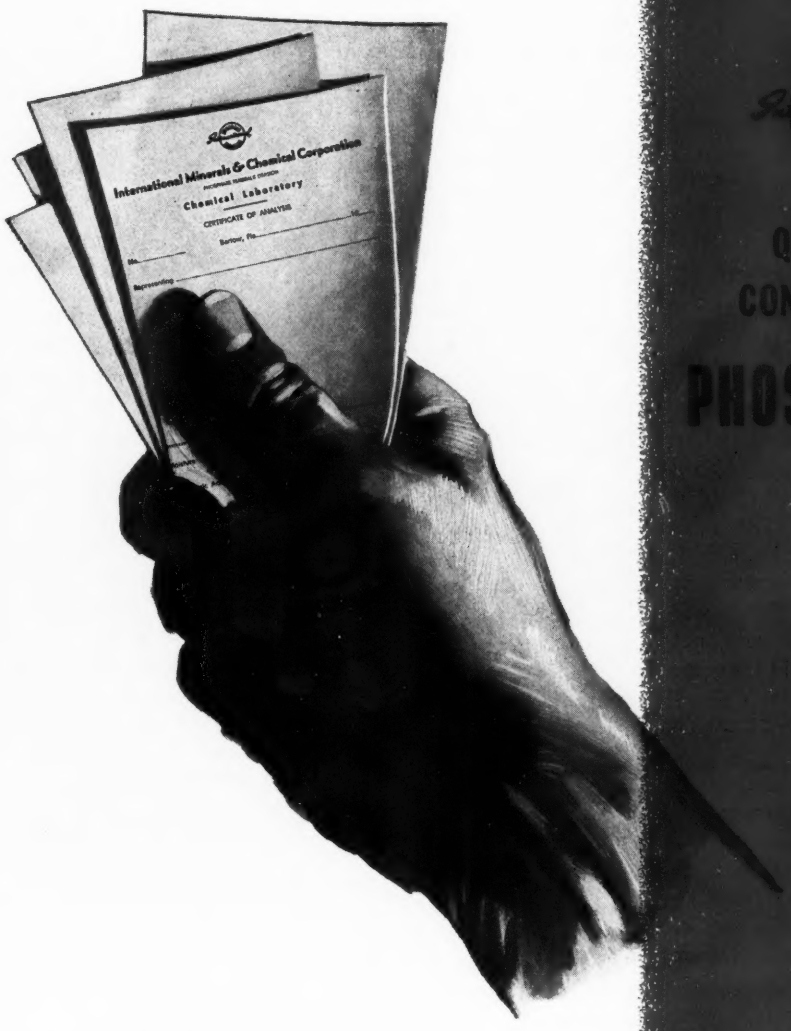
"Here is the only trouble-free system priced so low that every farmer can afford it. It's the only system that sidesteps corrosion problems. The farmer can use cheap secondhand oil drums for storage and supply tanks. He saves hundreds of dollars . . . because the exclusive, patented hose pump will not clog or stop up from corrosion or foreign particles. They pass right on through.

"The Krause-Liberty system will do every job most farmers want. It will apply non-pressure or low-pressure nitrogen or complete fertilizers, either on top of the soil or under it. It works with the farmer's present tractor and implements . . . needs no expensive 'extras.' It is fully field-tested, fully proved. And it is going to make a lot of money for the dealers who go out and push it."

"Do you want to know more? Write, wire or phone us . . . today."

KRAUSE®

KRAUSE PLOW CORPORATION
HUTCHINSON, KANSAS
PHONE MOhawk 5-4421



QUALITY
CONTROLLED

PHOSPHATES

YOUR PHOSPHATE
IS ANALYZED 5 TIMES BEFORE SHIPMENT

Careful testing of your phosphate at every stage of production—washing, blending, drying, grinding and loading—is one of the factors in *International's* quality control that assures uniformity of grade to exact specifications. Your phosphate is sampled and tested in our analytical laboratory at least five times before shipment. Blending grades to your special requirements is simple routine because of our large tonnage and the flexibility of our modern production facilities. When you depend on *International* for phosphates, our great team of mining, production and service people sees to it that you get exactly what you order, in the tonnage you need, when you want it. That's what quality control means.

FOR INDUSTRY
AND AGRICULTURE

- for the manufacture of complete fertilizers.
- for the manufacture of industrial chemicals.
- ground rock phosphate for direct application to the soil.

PHOSPHATE MINERALS DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

GENERAL OFFICES: 20 N. WACKER DR., CHICAGO 6 • Phosphate Mines and Plants in Florida at Noralyn, Peace Valley

. . . Business & Management

After Six Months . . .

Commercial Solvents

Sales of $24,956,927 have been reported by Commercial Solvents corp. during the first six months of this year, against $23,769,206 during the first half of last year. Net earnings were $1,572,171, compared with $1,259,642 for the same period in 1954.

Diamond Alkali

A new high in sales and earnings for the six month period ending June 30 has been reported by Diamond Alkali co.

Net sales were $53,660,322, compared to $47,059,190 in 1954, while net income after provision for Federal Income Taxes was $4,045,573, compared with net income of $3,197,758, in the same period of 1954.

Michigan Chemical

Net income of 25 cents per share of common stock was earned by Michigan Chemical corp. for the six months ended June 30, 1955, as compared to a loss of 18 cents a share in the first six months of 1954.

Before taxes, earnings were $141,238 against a loss of $118,999 in the comparable period in 1954.

Olin Mathieson

For the first six months of 1955, Olin Mathieson Chemical corp. sales in the U. S. and Canada rose to $270,800,964 from $244,-167,642 in the first half of 1954. Earnings in the first half of this year amounted to $19,941,739 or $1.60 per share of common stock.

Phillips Petroleum

During the first six months of this year, gross income of Phillips Petroleum co. and its subsidiaries was $430,016,421, against $392,-006,543 for the first six months of 1954.

Net profit was $42,575,770 or $2.80 per share, compared with $37,918,723 or $2.59 per share for the same period last year.

Sales volume of all petroleum products was 6 per cent higher, while fertilizer sales value was up 35 per cent, according to the company's report.

Pgh. Plate Glass

Sales of Pittsburgh Plate Glass co. and consolidated subsidiaries during the first six months of 1955 amounted to a record $288,535,-825, according to Harry B. Higgins, president. This represents an increase of 42.7 per cent over sales of $202,232,105 reported for the first half of last year.

Net earnings also reached a record high, $32,562,512, equivalent to $3.50 per share, compared with net income of $16,908,172 or $1.85 per share during the comparable period of 1954.

Higgins said that sales of Columbia-Southern Chemical corp. were substantially above those during the first six months of 1954.

Stauffer Chemical

Stauffer Chemical co. sales for the six months ended June 30, were $50,179,000, an increase of 25 per cent over sales of $40,081,-000 for the same period last year. Net earnings of $4,128,000 or $1.76 per share, the company reports, reflected a 41 per cent increase over earnings of $2,927,-000 or $1.25 per share in the first half of 1954.

The company stated that demand for its agricultural chemicals showed marked improvement, with sales running about 40 per cent above last year.

PEOPLE

American Agricultural Chemical co. George S. Linton has been promoted to manager of AAC's new Humboldt, Iowa, branch, and Ronald R. Johnson has been named sales supervisor at Humboldt.

Linton has been with the firm for the past 18 years, serving as assistant manager of the Buffalo office at the time of his new appointment. A graduate of the University of Missouri, Johnson joined AAC in 1950 and has been with the western sales and field service organization.

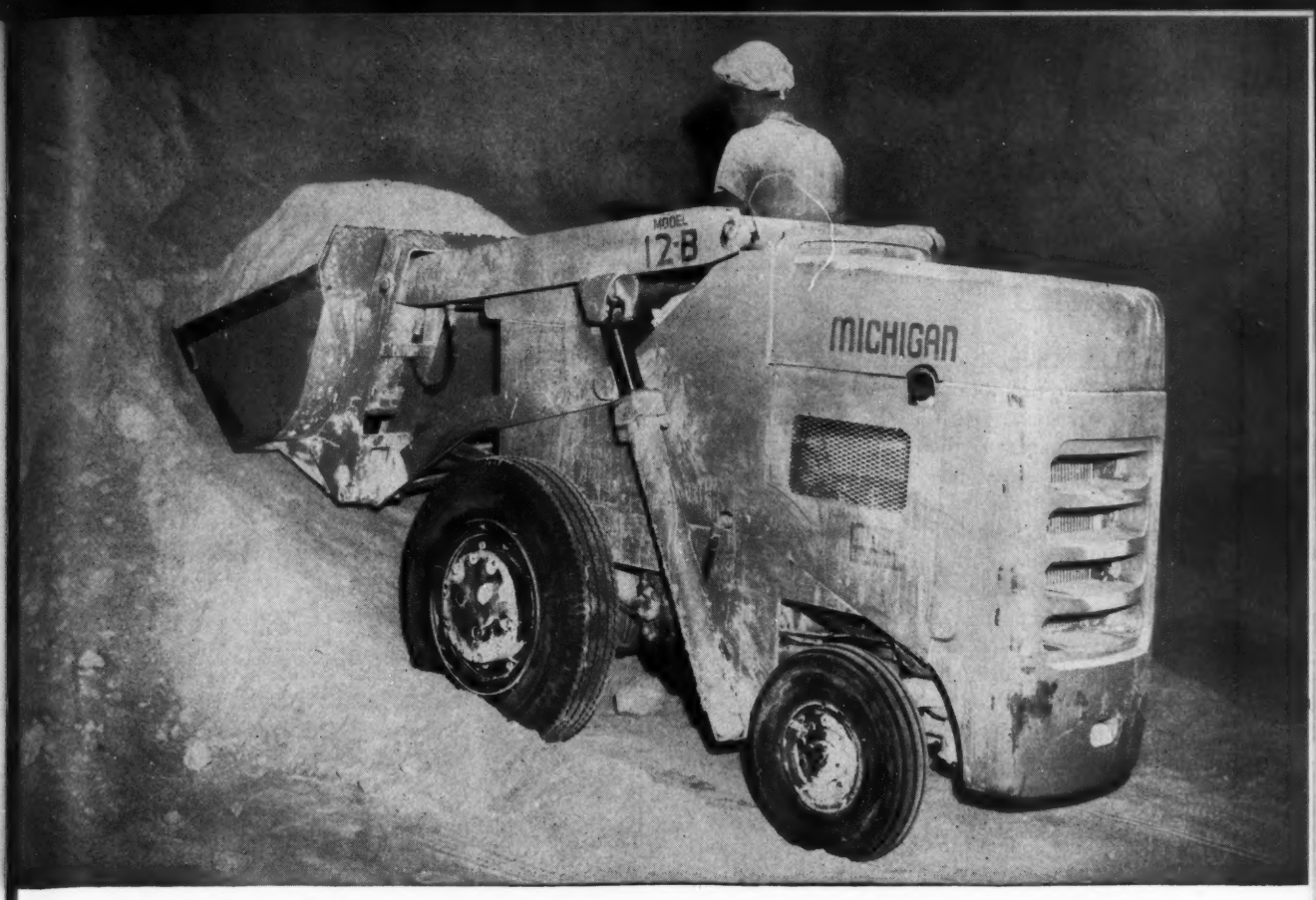
Climax Molybdenum co. Appointment of George L. Innes as manager of chemical sales is announced by L. E. Ekholm, manager-sales. Innes will have full responsibility for sales of molybdenum chemicals and moly for chemical uses in both industry and agriculture.

Before joining Climax, he was sales manager of Jefferson Chemical, and previously had been associated with Nopco Chemical co., Ciba co. and Monsanto Chemical co.

DuPont co. Wallace E. Gordon, assistant director of sales of the Grasselli Chemicals dept., was recently named director of the company's advertising dept., effective Sept. 1, succeeding William A. Hart, who retired in late August.

Gordon joined DuPont co. in 1933 as a chemist after receiving the degree of doctor of philosophy in organic chemistry at the University of Michigan.

Newly named assistant director of sales succeeding Gordon is W. James Latimore, former Chicago district sales manager. He will have supervision (*to page 20*)



Report on the 15 cu. ft. MICHIGAN 12B:

New Tractor Shovel features power-shifting, twenty per cent more weight and power

Heavier and more powerful than comparable machines, and infinitely easier to operate—that's the new MICHIGAN 12B. There's no clutch pedal or engine clutch on the 12B: Clark's power-shift transmission completely eliminates this notorious cause of excessive maintenance and down time. From the cutting edge of the 15 cu. ft. bucket to the flywheel of the 44 or 42 horsepower engine (gas or diesel), the MICHIGAN 12B is simply *more* machine.

20% more weight and power. At 6250 lbs. (6350 lbs. diesel), the 12B is 20% heavier than most machines in its class. With 44 or 42 horsepower, gas or diesel, it is 20% more powerful. This margin of weight and power, plus bucket break-out action, enables the 12B to dig its way into material where other machines merely spin their wheels. The 12B's extra weight, low center of gravity and low-level bucket carry-position contribute to its superior stability: you can handle maximum loads safely and fast within its short turning radius.

Complete dust protection. The 12B is protected against dust and dirt in every conceivable way. An oil bath air cleaner filters the air which enters the main hydraulic reservoir. There is a filter for the torque converter oil and the power-shift transmission oil. A partial flow filter protects the engine lube oil. Transmission, torque converter, starting motor and generator are all dust-sealed. On the 12B, every precaution has been taken to avoid dust problems.

Make your own comparison. Neither words nor specifications can indicate the working superiority of the new MICHIGAN 12B. You've got to see it in action—see it handling your toughest job. Call your local MICHIGAN distributor or write us direct to arrange an on-the-job demonstration. The new 12B is available on a low cost, no-down-payment Lease Plan—ask for details. Whether you lease or buy the 12B, it will pay for itself faster than any Tractor Shovel you've ever seen. See it!

MICHIGAN is a trade-mark of Clark Equipment Co.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
530 Second Street
Benton Harbor 36, Michigan

. . . People

(*from page 18*) of biological chemicals sales and development, and of export sales.

Food Machinery and Chemical corp. Two promotions in the chemical divisions: Russell B. Stoddard, manager of the Fairfield Chemical div., has been assigned to the technical staff of the chemical divisions administrative offices, New York City.

Southeastern manager of the Niagara Chemical div., Robert H. F. Dade, has been named to succeed Stoddard as manager of Fairfield.

A national authority on pyrethrum and pesticides, Stoddard was formerly connected with US Industrial Chem. co. Dade was a founder of the Peninsular Chem. co. at Orlando, Fla., which was acquired by Niagara in 1929. He has managed Niagara operations in the Southeast since that time.

Kilgore Seed co. After 26 years as secretary and sales manager, Henry W. Schneck has retired and is going to the College of Agriculture of the National Taiwan University, Taipei, Formosa, as vegetable seed specialist.

Manufacturing Chemists' Association. General John E. Hull, U.S.A., (Ret.), former US and UN commander-in-chief in the Far East, has been elected president of MCA and will begin his new duties immediately with headquarters at the association's offices in Washington, D. C.

Miami Fertilizer co. Glenn J. Noggle, for 29 years chemist and factory manager for the firm, recently retired. Succeeding him is Clarence D. Crickmore, who has been assistant factory manager for nine years.

National Potash co. William B. Porterfield joins the firm as

Porterfield

vice president and sales manager following his resignation as assistant sales manager of United States Potash co.

A graduate of Virgina Polytechnic Institute, Porterfield served with Chilean Nitrate Sales corp. before going with U.S. Potash in 1947 as sales representative for the eastern seaboard.

Pennsylvania Salt Manufacturing co. Newly named manager of the I. P. Thomas div.'s Paulsboro, N. J., plant is George Brown. A native Philadelphian, Brown had been assigned to Pennsalt's Industrial Chemicals div. as assistant to the manager of manufacturing. He went to the company in 1953 from American Viscose corp.

Brown

Pittsburgh Coke & Chemical co. Appointment of Hugh Swink as field sales manager of the company's Agricultural Chemicals div. was recently announced.

Swink

Swink will continue as manager of the division's Dallas office, in charge of agricultural chemical sales in the Southern cotton belt area.

Shell Chemical corp. Five staff changes: L. G. Smith, who has been assistant to the sales manager, is appointed manager of the newly-created Distribution-Operations dept.; W. E. McCauley, head of Product and Sales Development dept., is named assistant to the sales manager; C. C. Compton is designated manager of the Sales Development dept., formerly known as the Product and Sales Development dept.; H. H. Dodge, senior St. Louis district representative, is new supervisor for the Sales Development dept. in the Midwest area; and J. F. White will be district manager for the newly-created Delta-Houston area. District headquarters will remain at Jackson, Miss.

Five organizational changes in the head office Treasury dept. also were announced: R. K. Burns is now manager; P. J. Morel, assistant manager of financial accounting; W. F. Read, assistant manager, financial analysis and budgets, succeeding F. Fazio, transferred to San Francisco as chief accountant in the Ammonia div., replacing M. E. Lilley, assigned to head office.

Spencer Chemical co. Kenneth Spencer, president, has announced two major shifts in the Spencer organization. Richard F. Brown, general works manager, is now vice president and general works manager and in the second move, research and development activities of the company were established as a separate division, with Dr. John R. Brown, Jr., general manager of research and development, as managing director.

Paul L. Weller, manager of Market Research for Spencer, has been named assistant to Joe E. Culpepper, vice president in charge of sales. Weller has served as market research head since November 1953 when he went with Spencer.

Weller

Here's another way LION IS HELPING YOU sell more Nitrogen Fertilizer

Impressive, Big-Space Advertisements are Appearing Month-After-Month in all These Publications

Lion's Chemical Sales Division is working to make sure you, as a fertilizer mixer, sell more fertilizers. One way we help is by consistent advertising to dealers and farmers. This advertising emphasizes how plant foods can best serve the farmer by increasing his profits.

We also offer One-Stop Service—which means you can contract for your nitrogen requirements from a single dependable source, saving you time (which, these days, is money!). As for *quality*, you can build your own reputation on a solid basis when you depend on Lion quality.

And when you need assistance with a formulation problem, our skilled Lion technical staff is ready to help you.

Our great storage facilities and the variety and flexibility of our manufacturing operations assure you of prompt shipment.

LION—A LEADER IN PETRO-CHEMICALS OFFERS:

Lion Anhydrous Ammonia—For formulation. A uniformly high-quality basic product. Nitrogen content, 82.2%.

Lion Aqua Ammonia—For formulation or acid oxidation. Ammonia content about 30%. Other grades to suit you.

Lion Ammonium Nitrate Fertilizer—For formulation or direct application. Improved spherical pellets. Guaranteed 33.5% nitrogen. Flows freely, spreads evenly.

Lion Nitrogen Fertilizer Solutions—For formulation. Three types to suit varying weather and manufacturing conditions.

Lion Sulphate of Ammonia—For formulation or direct application. Uniform, free-flowing crystals. Guaranteed to contain a minimum of 21% nitrogen.

DISTRICT SALES OFFICES:

NATIONAL BANK OF COMMERCE BUILDING, NEW ORLEANS, LOUISIANA • SHEPHERD BUILDING, MONTGOMERY, ALABAMA

WORLD'S LARGEST MANUFACTURER OF PRILLED AMMONIUM NITRATE

LION OIL COMPANY

CHEMICAL SALES DIVISION

EL DORADO, ARKANSAS

LION

Associations & Meetings

S.C. Safety Meet Program Released

On Nov. 4, the Fertilizer Section Safety Meeting for South Carolina will be held at the Francis Marion Hotel, Charleston, S. C., in conjunction with the annual meeting of the South Carolina Accident Prevention Conference.

With Alton L. Foster, superintendent, International Minerals & Chemical corp., Spartanburg, presiding, the meeting will include a "Report on Activities of Safety Organizations" by Vernon S. Gornto, Smith-Douglass co.; a discussion of "Acidulation Hazards" by E. U. Campbell, Anderson Fertilizer co.; "Safety Organization in a Small Plant," J. P. Huckaby, Southern Fertilizer & Chemical co.; "Materials Handling Hazards," Percy L. Steel, F. S. Royster Guano co.; "Electrical Hazards," Ralph C. Haltiwanger, Virginia-Carolina Chemical corp.; and "Application of Dressings for Practical First Aid," Cleo H. Everhart, Southern First Aid co.

Benson to Address FEI Convention

USDA Secretary Ezra Taft Benson is among the speakers scheduled to address the 62nd annual meeting of the Farm Equipment Institute at the Roosevelt Hotel, New Orleans, Sept. 18-21.

Business programs have been planned for the 20th and 21st, with the group's annual dinner set for Sept. 21. Banquet speaker is Hugh M. Comer, chairman of the board, Avondale Mills.

AMA Management Group Meetings

American Management Association reports it will conduct more than 350 small-group management meetings between September, 1955 and June, 1956.

The complete fall schedule, comprising more than 160 seminar groups for discussion of more than 100 different topics between now and the end of January has just been published, and copies may be obtained from the Seminar Registrar, American Management Association, 330 West 42nd St., New York City 36.

Oakland Garden Show Cancelled

Garden Supply Merchandiser, Inc. has cancelled its Western States Garden Supply Trade Show originally scheduled for Oakland, Calif., on Sept. 13-15. Officials of the organization said that lack of interest in the show at this time made the action advisable.

Arbitration Case on TV at AMA Session

An actual labor-management arbitration session will be presented for the first time on closed-circuit television at the fall personnel conference of the American Management Association, to be held Sept. 26-28 at the Hotel Statler, New York City.

"Speech Formulas," Latest from NSC

"A Pocket Book of Speech Formulas," a new 36-page training aid for foremen and other supervisors recently published by the National Safety Council, shows how to practice a speech, use the best voice, hold audience interest and make the speech teach. Illustrated with line drawings, the manual is available to NSC members at 60 cents each and to nonmembers at $1.20 from National Safety Council, 425 N. Michigan Ave., Chicago, Ill.

Etheredge Appoints ASFFCO Groups

Recently elected president of the Association of Southern Feed and Fertilizer Control Officials, Dr. M. P. Etheredge, has announced the following committee appointments for 1955-56:

Fertilizer committee: Bruce Cloaninger, South Carolina, chairman; Dr. J. F. Fudge, Texas, L. C. Jacobs, Tennessee.

Feed committee: Bruce Poundstone, Kentucky, ex-officio chairman; E. A. Epps, Louisiana; Harold Hoffman, Florida; W. J. Huffman, Mississippi.

Pesticide committee: Rodney Berry, Virginia, chairman; Clyde Bowler, Oklahoma; Dr. Henry DeSalvo, Arkansas.

Constitution & By-Laws committee: Dr. Ernest Constable, North Carolina, chairman; Miss Frances Bonner, Louisiana; Dr. Willis Richerson, Oklahoma.

Editorial committee: F. D. Brock, Texas, chairman; James C. Oswald, Georgia; John Reitzel, North Carolina.

Nominating committee: Parks Yeats, Oklahoma, chairman; Geo. Marsh, Alabama; Joe Taylor, Florida.

The 1956 meeting of the ASFFCO will be held in Roanoke, Va., June 28-30.

Course for Tank Truck Personnel

A three-day course designed to acquaint tank truck carrier personnel with safe and efficient transportation of chemicals, gases, foods and dry bulk commodities was held Aug. 29 to Sept. 1 at the Illinois Institute of Technology, Chicago.

Sponsored by the National Tank Truck Carriers, inc. in cooperation with the Manufacturing Chemists' association and National Tank and Trailer Tank Institute, the course was instructed by personnel experienced in tank truck operations and chemicals.

Your best assurance for a *continuous* supply is a completely integrated supplier!

FEATURES	KRAFT BAG CORPORATION	OTHER SOURCES ?
Forest Lands	✓	
Pulp Mill	✓	
Bleach Plant	✓	
Paper Mill	✓	
Multiple Bag Plants	✓	
Natural Kraft	✓	
Colored Kraft	✓	
Bleached Kraft	✓	
Creped Kraft	✓	
Wax Laminated Kraft	✓	
Asphalt Laminated Kraft	✓	
Wet-Strength Kraft	✓	
Water Repellent Kraft	✓	
Stak-LOK Super Rough Kraft	✓	
Valve Bags—sewn or pasted	✓	
Open Mouth Bags—sewn or pasted	✓	
Flat Sewn Valve Bags	✓	
Flat Sewn Open Mouth Bags	✓	
KRAFT-lok Valve Closure	✓	
Creped Tape	✓	
Gummed Tape	✓	
Filter Cord	✓	
Sewing Thread—(the only material we do not produce ourselves)		
1-2-3-4 Color Printing	✓	
Art Department	✓	
Bag Development and Research	✓	

Gilman PAPER CO.
• St. Marys Kraft Corp.
• Gummed Tape Div.
• The Gilbound Corp.
• Kraft Bag Corp.

KRAFT BAG CORPORATION

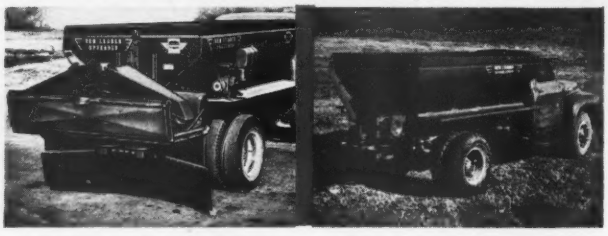
"NEW LEADER" takes the guesswork out of...

COMMERCIAL FERTILIZER SPREADING!*

*NEW LEADER METERING ATTACHMENT ASSURES EXACT SPREAD PER ACRE!

Here's another *New Leader* engineering first! A simple, foolproof mechanism—the *New Leader* Metering Attachment takes all guesswork out of commercial fertilizer spreading. By accurately measuring the amount of fertilizer being fed to the twin distributor discs, correct feedgate settings are obtained. Accurate metering of spreads of from 100 pounds per acre up are assured. This is a feature beneficial to fertilizer manufacturers, suppliers, custom operators and farmers alike.

Motor-driven twin distributor discs and drive-shaft driven conveyor is the answer to the most accurate truck mounted spreader in the world.



COMBINATION SPREADER
(with Hood in Road Travel or Lime Spreading Position)
Set the feedgate, drive straight and you can't miss getting an accurate spread. Conveyor is geared to ground speed assuring an accurate flow of material. The twin distributor discs are powered by a separate auxiliary engine, which assures you of a constant width of spread, regardless of the speed of the truck.

NEW LEADER LIME SPREADER
Twin distributor discs, 24" wide conveyor and large feedgate opening eliminates bridging of material and assures accurate, more even spreads.

"NEW LEADER" Self-Unloading Transports deliver more materials FASTER . . . AT LESS COST!

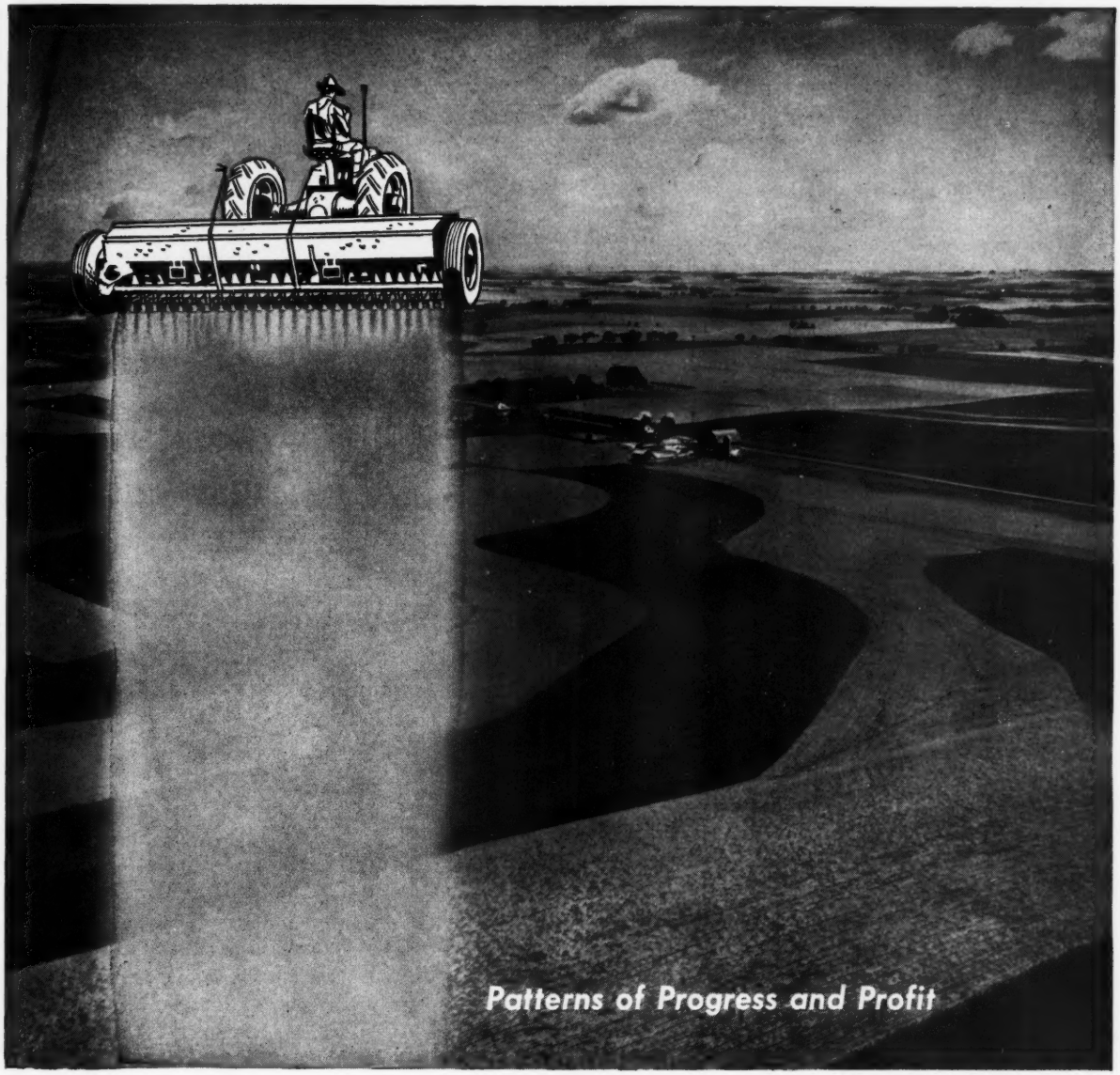
Write today for information and prices

Here's one sure way to increase your tonnage and prolong your season by providing commercial fertilizer in bulk to your dealers! The NEW LEADER Self-Unloading Bulk Transport giving your dealers bulk delivery of fertilizer when and where they want it. In addition to mixed goods the NEW LEADER Self-Unloading Bulk Transport can be equipped to haul bagged materials when necessary. Many companies recognize this method of distribution and find that it has reduced many problems such as storage, extra inventory, etc.

Write, Phone or Wire today for complete information, specifications and prices!

HIGHWAY EQUIPMENT CO., Inc.

MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SPREADERS AND BULK DELIVERY EQUIPMENT



(Photo — Courtesy Soil Conservation Service, U. S. D. A.)

High Grade Muriate of Potash

by DUVAL

Duval Muriate of Potash ranks high as one of the essential nutrients which greatly increase yield and profits in crop production.

DUVAL SULPHUR and POTASH CO.
Modern Plant and Refinery at Carlsbad, New Mexico

Address all communications to:
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GOVERNMENT

Brine Shrimp Used In Residue Tests

A tiny crustacean, the brine shrimp, holds promise of providing an excellent test for presence of insecticide residues according to USDA. It reacts to very small amounts of several insecticides, even when the toxicants are greatly diluted in fresh or salt water.

Ease of maintaining and using the shrimp make them an ideal laboratory tool. Tests have shown its sensitivity to as little as one ppm of insecticide and it reacted to all insecticides tested—chlordane, DDT, lindane, methoxychlor and toxaphene.

Presence of a residue in test solution is indicated by changes in normal swimming habit of the crustacea with the rapidity of chance a measure of insecticide concentration.

Even in extremely dilute solutions the changes were noticeable in less than two hours.

Granular Materials For Corn Borer

In cooperative USDA-state tests at Ankeny, Iowa, granular type insecticides have shown promise for controlling the European corn borer. Granular forms of DDT, EPN and heptachlor gave control as good, or possibly better, than emulsion sprays.

In addition, they were found to leave 100 to 200 times less insecticide residue on the plants and may be the answer to the residue problem facing farmers who graze livestock in their fields after harvest or who put up stalks and leaves as silage.

Tests during 1953 against first-brood borers showed no significant difference between granular DDT, EPN and heptachlor. Of the two carriers used, tobacco and attapulgite, the latter proved superior.

Last year there was no significant difference between DDT, malathion, heptachlor and EPN or between the two carriers.

A need for new application equipment for such materials is seen, if field work continues to show excellent control.

ICA Authorizations

Iran. $21,718—agricultural pesticides (PIO/C No. 65-13-003-5-50570). Source—USA and poss. Ending delivery date—Dec. 30. Procurement through Emergency Procurement Service, GSA.

$31,232—fertilizers (PIO/C No. 65–13–075–5–51071). Source—World wide. Ending delivery date—December 31. Procurement through EPS, GSA. Includes nitrogenous, $12,200; potash, $6,832; phosphatic and others, $12,200.

Pakistan. $93,914—agricultural pesticides (PIO/C No. 91-13–022–5–50347). Source—World wide. Ending delivery date—Jan. 31, 1956. Contract period—July 26–Nov. 11, 1955. Procurement through Pakistan Ministry of Industries, Department of Supply & Development.

Maine Late Blight Forecast Service

Instituted by USDA and the Maine AES, a new late blight warning service in Aroostook county, Me. is expected to help prevent extensive future loses on the state potato crop.

The service represents an extension of USDA's cooperative Plant Disease Warning Service, which has now been in operation for seven years.

Late blight will be forecast following 10 days of weather favorable to the disease.

Accurate Avail. Soil P_2O_5 Measurement

Through use of radioactive phosphorus, USDA scientists have developed a method of measuring available soil phosphate so accurately that it can be expressed in terms of pounds of superphosphate equivalent per acre.

The development marks the first successful penetration of the soil make-up to learn how much of any specific plant nutrient is actually made available to plants. Similar methods are expected to result from current research for determining amounts of other soil nutrients available to plants.

Maurice Fried and L. A. Dean developed the test by measuring plant absorption of phosphorus from two sources: the natural soil-held material and radioactive phosphate fertilizer mixed with the soil.

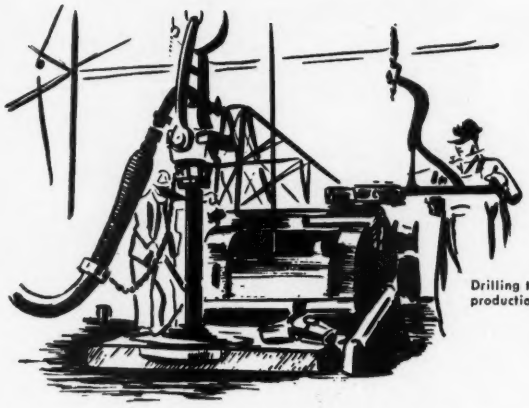
Soil Survey Plans

Current soil survey plans call for completion of field mapping in critical areas of the Great Plains states by June 30, 1959. The set-up in activity results from a June conference in Denver and affects work in Wyoming, Nebraska, Kansas, Colorado, Oklahoma, New Mexico and Texas.

Discount Supports on 23 Wheats in '56

A discount of 20 cents per bushel in 1956 price-supports has been announced by USDA for 23 wheat varieties termed undesirable because of inferior milling or baking qualities. All five major classes of wheat produced in the U. S. are represented, and 21 states are involved.

USDA explained that while the varieties are planted to meet specific production problems such as drought or rust resistance, early maturity or adaption for modern harvesting methods, they proved undesirable for commercial food use.



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- **MOSS BLUFF, TEXAS**
- **SPINDLETOP, TEXAS**
- **WORLAND, WYOMING**

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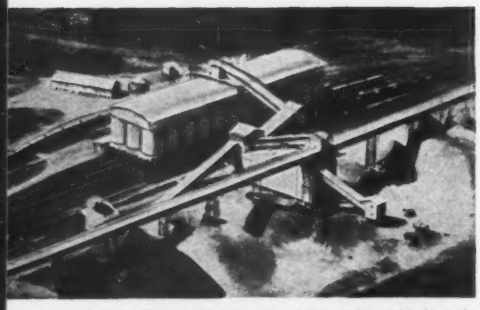
AA Quality...

for over 85 years a symbol of quality and reliability



From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock
AA QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers **Superphosphate**
Gelatin **Bone Products** **Salt Cake** **Ammonium Carbonate**
Sulphuric Acid **Fluosilicates** **Insecticides and Fungicides**
Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus

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GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

30 FACTORIES AND SALES OFFICES, SERVING U.S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

Washington Report

By John Harms

- **Look for all-out production damper in '56**
- **USDA studies bonus for conservation acres**
- **Bulk fertilizer distribution report due this fall**

Biggest farm crop production in history this year is loaded with meaning to fertilizer, pesticide and other industries selling the agricultural market.

It boils down to the need for harder selling in the farm market next year and probably succeeding years. Reason is this: Big production, plus large hold-over supplies, brings stocks of many major commodities to the "saturation" point. Starting with next year, you can count on all-out Government effort to hold down production. Production damper is seen as the only sure way of diminishing farm price-depressing surpluses.

Here's an early view of what 1955 production—which is topping the all-time record of 1948—means to farmers, and through them to you:

Corn. We're getting the second largest crop in history. That, plus record hold-over supplies from last year, gives us more feed grains than we need—a new record. Result is that the Government is planning on a sharp cutback in corn acreage in 1956. Acre allotments this year were set at 50 million. For next year, officials believe they may have to cut allotments—which apply only to 805 counties in the "commercial" area (mostly Midwest)—to a drastic 40 million acres. When this is announced, it will be tough news to corn growers. They will be taking as big a production and income blow as wheat growers have during the past 2 years.

In addition to the big acre cut now planned, officials say that price support for corn will have to be reduced. Support in 1955 is $1.58 per bushel—87 per cent of parity. Preliminary estimates indicate this will have to be cut by almost 30 cents per bushel in 1956, according to the ruling laws.

For corn growers, this means many more will disregard acre allotments and forfeit price supports. They'll grow more than 40 million acres in the Corn Belt—and most of it will go into hogs. It means a much lower corn market and probably less income.

Other feed grains—oats, barley, grain sorghums. There is growing pressure inside the USDA to drop price support on these altogether—as a means of discouraging further expansion in production. This would bring about a much lower feed grain market price level. Growers, however, would probably boost production a great deal in order to piece out income losses from a reduction in prices.

Soybeans. The crop jumped from last year's record 343 million bushels to a whopping 420 million bushels. If export markets fail to drain off close to 100 million bushels—acreage controls and lower supports are forecast for 1956.

Rice. A further cut in acreage allotments is in sight for 1956—as a result of record supplies. In addition, the governing law almost assures that price supports will be dropped from the present 85 per cent of parity, $4.66 per hundredweight, to a minimum 75 per cent of parity, or about $3.90. These are drastic cuts, which only unusual production or demand conditions could change.

Cotton. Farmers are producing 2.5 million bales this year over the Government-

established production goal of 10 billion bales. Acreages this year are slightly below 18 million, which could be expected to provide 10 billion bales under normal circumstances. But the cotton yield for the second straight year is hitting a new record. Per acre yield this year is estimated at a whopping 367 pounds . . . 26 pounds more than last year's record. The higher yields of the past 2 years will tend to force a cut-back in the acre allotment to perhaps 17 million. Price support for cotton will go down only slightly due to the commodity set-aside.

Wheat. Wheat price support for the 1956 crop has already been announced—almost at the minimum permitted by law, 76 per cent of parity. That comes to $1.81 per bushel—27 cents per bushel less than this year. If there was no built-in minimum in the law, acreages would be cut to about 20 million. As it is, wheat acreage will be held at 55 million for the 1956 crop.

Those are things the farm chemicals industry needs to know. It will have an impact on your market. We have given you a rather complete run-down on the outlook so you can make appropriate plans. Bear in mind that while events between now and planting time for next year's crops may change the picture to some extent —the general outlook is expected to hold true.

A sugar-coating may be offered farmers next year to sweeten up the bitter pill of reduced production, prices and income. The Agriculture department is studying seriously a proposal to offer farmers at least $10 per acre taken out of cash crops and put into grass or other conservation practice.

If the department decides against moving in this direction, the next session of Congress is certain to take it up—being mindful of the crucial 1956 presidential election. Several congressmen already have indicated a desire to supply this kind of "sweetener."

Brannan Plan is getting a thorough going-over in some quarters of the Agriculture department. The Administration farm officials are on a hot spot unless they advocate a substantial program to bring farm production and prices into better focus. There is growing feeling among economists and legislators in Washington that flexible supports will not do this rather herculean task.

Odds are stacked against this Administration embracing the Brannan Plan—which would have the Government pay farmers the difference between the free market price and an established support level. Main reason, of course, is that Republicans and many Democrats pretty thoroughly discredited the plan when it was first introduced. But there are some indications that a modified Brannan Plan may be adopted by the Administration.

A special feature of the Agriculture department's fertilizer consumption report this fall will be results of a survey on bulk distribution of fertilizer. This is part of a new service to the industry. Each year the department will survey a special aspect of the fertilizer business. The bulk distribution survey is for the 1953-54 year. For the 1954-55 year, USDA will report on the use of granular materials.

Granular-type insecticides show promise for controlling the European corn borer. Results of a 2-year test at Ankeny, Iowa, indicate that DDT, EPN and heptachlor used in granular form give as good, or possibly better, borer control than when used in conventional emulsion sprays. Furthermore, the Agriculture department says, they leave much less insecticide residue on the corn plants.

Officials see granular insecticides as a possible answer to the residue problem facing farmers who graze livestock on their cornfields after harvest or put up the stalks and leaves as silage. Toxic residues from insecticide-treated corn may accumulate in the body fat of livestock or be found in the milk of dairy cows when the animals are fed on the treated plants.

"Grab 'em—stack 'em—drop 'em! Burlap bags can take it."

— says R. T. Chilton, Madison, N. C.

"We buy fertilizer by the carload in 200-pound burlap bags because they're better to work with, and keep the fertilizer from molding. I prefer burlap bags because they don't break and spill. This helps us work faster and saves us money and time."

The Chilton farm covers over 1000 acres in a part of North Carolina where large quantities of fertilizer are used for growing tobacco, corn, oats, barley, lespedeza and other grains. The farmers order fertilizer in burlap bags because it keeps better and the bags are easier to handle. "We've never thrown an empty bag away. We can get 10¢ apiece for them but they are worth more to us right here on the farm. Our wives make lots of things for the house out of them, too."

Farmers all over the country tell us they prefer burlap bags for fertilizer and supplies. Make *your* brand a favorite by packing in burlap.

Just ask your own customers—

they'll tell you that burlap

Is strong — takes dragging, dropping, *man-handling* — any tough job on the farm.

Gives good ventilation — keeps farm supplies and products fresh.

Laughs at sudden showers — wetness or dampness can't weaken it.

Saves money — extra value from re-sale and re-use.

Saves storage space — stacks to any height without slipping.

Has 1000 uses — always in demand on the farm (popular with farm wives, too!)

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Chemicals

315—De-Fol-Ate

Penco De-Fol-Ate magnesium chlorate-type defoliant has been proven commercially on large scale cotton acreage. The material dissolves quickly in water, increases picking efficiency, causes bolls to open more uniformly and is not acutely toxic or unpleasant to handle. It is available from Pennsalt in 50 lb. bags. For a service bulletin describing this top cotton defoliant

CIRCLE 315 ON SERVICE CARD

316—Diamond Literature

Diamond Alkali has issued a mimeographed guide to available literature covering its chemicals and their uses. Included is brief information on reference manuals and handbooks, technical bulletins and other Diamond publications. For a copy of this checklist

CIRCLE 316 ON SERVICE CARD

317—Cotton Pests

Cotton insects in natural color are shown in a new pocket size booklet from Velsicol with information on control, use of Heptachlor formulations and rates of application. A second piece of current literature is the cotton insect quiz folder in which 32 questions and answers cover the use of heptachlor for cotton pests. For a copy of each

CIRCLE 317 ON SERVICE CARD

318—Chlorinated Solvents

The Diamond Alkali line of specialized chlorinated solvents are reviewed in a new 14 page technical bulletin. In quick-reference digest form, the booklet provides, for each chemical, a description, physical properties, typical shipping analysis, major uses, handling precautions and size of containers for shipment. For chemical producers only.

CIRCLE 318 ON SERVICE CARD

319—Antara Chemicals

Organic chemicals are covered in the latest of a series of brochures describing Antara Chemicals products. An index lists each chemical by name and most common synonyms, and in the data section, they are arranged by the normal Antara designation with descriptions, minimum standards governing shipment and hazards, when present.

CIRCLE 319 ON SERVICE CARD

320—Pyrophyllite

Glendon Pyrophyllite terms its product the ideal diluent and extender for insecticides. The insecticide grade material has a *p*H range of 6-7 and is compatible with all major pesticide chemicals. Company mines and plant are at Glendon, N. C. For a pamphlet

CIRCLE 320 ON SERVICE CARD

FREE INFORMATION to help you solve fertilizer, pesticide problems

Reader Service

321—Ferti-Liquid

Clover Chemical is looking for jobbers and distributors to handle its Ferti-Liquid all purpose plant food. The product is non-corrosive, has a 10-20-10 formula and includes a penetrating agent, trace elements and plant growth stimulant. If you are interested in a protected territory

CIRCLE 321 ON SERVICE CARD

322—Lime Data

A complete, factual reference manual on manufacturing processes, applications of lime and lime products has been released by Ohio Lime. The 28 page book takes you from the open quarry through manufacture of lime products to applications and specifications that govern correct methods of use. For a copy

CIRCLE 322 ON SERVICE CARD

How to use the READER SERVICE CARD

- **Circle number of literature you want.**
- **Print or type your name, position, company and address.**
- **Clip and mail the Service Card.**

Process Equipt.

323—Micronizer

The new, improved Sturtevant Micronizer grinding machine is engineered to grind insecticide components to any size specification and at high product speeds. Easily cleaned with minimum loss of material, it is simple to install and operate. The unit can be provided alone or as a complete operation with premixing, grinding and bagging equipment. For complete information

CIRCLE 323 ON SERVICE CARD

324—Williams Roller Mills

Precision size control and high production rates are just two of the superior features of Williams roller mills. Instant adjustment from 20 mesh to 400 mesh or micron sizes can be made and finished products can be maintained at finenesses of over 99.9 per cent passing 325 mesh. Rugged construction means lower down time, power costs and maintenance and automatic take-up for wear is continuous. For literature

CIRCLE 324 ON SERVICE CARD

325—Uni-Blender

Poulsen's RTR Uni-Blender compounding plants now incorporate micropulverizers and Stoker valve bag packers. The compact, ready-to-run units assure maximum production, uniform quality and minimum costs. The dual type elevates, mixes, pulverizes, blends and packages dust concentrates and field strength dusts including those involving liquid impregnation. Jacketed mixers can be supplied. For technical bulletins

CIRCLE 325 ON SERVICE CARD

326—Hercules Mill

The pneumatic Hercules mill from Bradley Pulverizer is the only such roller mill installed at floor level. It is designed for fine grinding of phosphate rocks, limestone and other materials producing a uniform grind from 20 to 325 mesh. Dependable operation is assured by a non-clogging vibratory feeder and material with excessive moisture can be dried within the mill system. For a catalog

CIRCLE 326 ON SERVICE CARD

327—Renneburg Dryer

The conventional dryer produced by Edw. Renneburg & Sons is a heavy-duty rotary unit with furnace, burner, breeching and sir handling system. Chemical producers will be interested in its applications in producing ammoniated, granular fertilizers and other chemicals. For literature and information

CIRCLE 327 ON SERVICE CARD

328—Fume Scrubbers

Technical details on fume scrubbers and packaged scrubbing systems are contained in a new edition of a bulletin from Schutte & Koerting. Water or other liquid is used as the scrubbing agent in these units for control of fumes or dust, and they are adaptable for handling solid particles, liquid particules or gases. Typical applications include acidulation of phosphate rock, removal of SO_2 and handling fluorine, ammonia, etc. Specific models and systems are described in detail with cut-away views, tables of dimensions, and extensive data on gas handling capacities. For a copy

CIRCLE 328 ON SERVICE CARD

Materials Handling

329—12B Tractor Shovel

The new Clark Equipment Michigan 12B tractor shovel features power shifting and 20 per cent more weight and power. Su perior stability results from extra weight, a low center of gravity and low-level bucket carry position. It is equipped with a 15 cu. ft. bucket and is well protected from dust and dirt with filters, air cleaner and dust-sealed transmission, torque converter, starting motor and generator. For more data

CIRCLE 329 ON SERVICE CARD

330—SealMaster

You can save dollars, says Stephens-Adamson, by using the SealMaster 2-bolt flange unit. Installation costs are cut by elimination of two fasteners and operations required for two mounting holes. Closer bearing spacing on multiple shaft installations is possible. The units center on present four bolt flange units and carry the same load rating for a given shaft size. For a bulletin

CIRCLE 330 ON SERVICE CARD

331—Jeffrey Products

Information on the products of Jeffrey Mfg. are contained in a new pocket-size catalog. Basic data has been consolidated in a convenient manner in this booklet, a revision of the former "What We Make." For a copy

CIRCLE 331 ON SERVICE CARD

332—Auto-Scoop

Jaeger's Auto-Scoop is specially designed to work easily in box cars, narrow aisles and other tight places. Low bucket tilt-back on the 12 cu. ft. unit assists full-bucket loading and permits carry as low as 4½" from the ground. Specifications include 6'6" turning radius, 13.88 mph in reverse, 7.66 mph forward, 6'8" clearance and 2'7" reach. A 1 cu. yd. Load-Plus is available. For a catalog

CIRCLE 332 ON SERVICE CARD

333—Fluoroflex Pipe

Physical and chemical properties of Fluoroflex-T laminated pipe are described in a folder from Resistoflex. Other data includes piping specifications, detailed description of flanging and coupling the laminated fluocarbon resin pipe and suggested applications for the chemically inert plastic units.

CIRCLE 333 ON SERVICE CARD

Packaging

334—Sacking Scales

You can sack, weigh and visibly check-weigh in one operation with Exact Weight sacking scales. One simple operation does all three jobs on all five different models. Included in the line is a unit designed for ceiling suspension. For details

CIRCLE 334 ON SERVICE CARD

335—A&S Super-Ruff

Super-Ruff kraft from Arkell & Smiths assures maximum ease of handling and greater product protection. Multiwalls made of this material can be stacked high and provide 40 per cent more anti-slide insurance. For complete information

CIRCLE 335 ON SERVICE CARD

336—Displays

The 10th in Hinde & Dauch's little packaging library series covers the selection of vending displays that increase sales. The informative booklet describes and illustrates many types of economical H&D units. For a copy

CIRCLE 336 ON SERVICE CARD

Application and Storage

337—Krause Applicator

The first low-cost practical liquid fertilizer applicator is now sold by Krause Plow. This Krause-Liberty hose pump unit provides trouble-free operation for your farm-customer and is the only system that sidesteps corrosion problems. Low-pressure nitrogen or complete liquid fertilizers can be applied. If you are interested in details on a dealership

CIRCLE 337 ON SERVICE CARD

338—Rubber-lined Tanks

Complete data on low-cost A&C rubber-lined tanks is available from Abrasion & Corrosion Engineering. Ready for prompt delivery, the tanks assure complete corrosion protection from both phosphoric acid and nitrogen solutions at a cost, says A&C, far less than other types of dual purpose tanks. For complete details

CIRCLE 338 ON SERVICE CARD

Miscellaneous

339—Platform Scale

Exact Weight's platform scale combines speed and accuracy with 500 lbs. capacity. The weight indicator is brought to rest quickly by a hydraulic damping mechanism and high-ratio visible indication enables your operator to make a quick, accurate reading. Indicator travel of three inches over and under is equivalent to three pounds over and under. For details

CIRCLE 339 ON SERVICE CARD

340—Soil Tests

On the spot Simplex soil tests can increase your fertilizer sales according to Edwards Laboratory. The testing outfits, available in three sizes, are easy, quick and accurate, enabling your reps to prove the need for added fertilization. For the latest catalog on these soil testers

CIRCLE 340 ON SERVICE CARD

341—Dustfoe Respirator

The MSA Dustfoe respirator is said to be ideal for breathing protection in fertilizer plants. Sturdy but light weight, it has an effective filtering action against dust not significantly more toxic than lead. For details

CIRCLE 341 ON SERVICE CARD

See pages 52, 53 & 54 for information on these Reader Service numbers—

342—ACP Fumarin
343—Glyco Tetrines
344—Napco Loader
345—Henderson Chief
346—Schelm Applicator
347—Fischbein Closer
348—Kromer Finish
349—Sparks Belt

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NAC Program Features Economic Trends And New Research

NEW developments in industry and Government research and trends in the national economy which will affect the pesticide industry during the next few years will be the highlights of National Agricultural Chemicals Association's 22nd annual meeting at Spring Lake, N. J., on September 7-9. Also scheduled is another panel discussion of developments relating to the Miller amendment.

The sessions will be opened with the presidential address of NAC head W. W. Allen, manager, agricultural chemical sales, The Dow Chemical company.

Others scheduled to appear on the program are Warren Moyer, president, Chipman Chemical company; H. E. Luedicke, editor, JOURNAL OF COMMERCE; A. W. Mohr, president, California Spray-Chemical corporation; Dr. John T. Thurston, director, Stamford Research Laboratories, American Cyanamid company; G. E. Lehker, professor of entomology, Purdue University; Dr. S. W. Simmons, chief, Technology branch, U.S. Public Health Service; James D. Hopkins, president, Hopkins Agricultural Chemical company.

Miller Bill Panel

Members of the Miller bill panel include Winton B. Rankin, assistant to the commissioner, FDA; Dr. W. G. Reed, head, Pesticide Regulations section, Plant Pest Control branch, USDA; and Dr. Charles W. Palm, head, Department of Entomology, Cornell.

Special features include a guided tour of the Walker-Gordon Dairy Farm, the world's largest scientific dairy and, for the ladies, a guided tour of the United Nations.

Discussing the emphasis placed on research and economics, Lea S. Hitchner, NAC executive secretary, points to the contribution of pesticides on the farm and in food industries, adding "through discovering new uses for materials now available and through developments of new products, research can greatly increase the contributions the industry will be able to make to agriculture and to the general welfare."

Economics is of great concern, Hitchner states, with Americans eating more each year as a result of rising incomes and with a steadily increasing population. He cites some estimates indicating that the food products market may increase by up to 25 per cent in the next five years.

"We must all be ready," he concludes, "with the most advanced technology to help produce greater volume of quality foods as the demand for them develops."

Program Committee

Chairman of the program committee is M. R. Budd, Hercules Powder company, and other members include Douglas G. Bennett, Phelps Dodge Refining company; Silas Besthoff, Faesy & Besthoff, Inc.; J. L. Damon, General Chemical division; L. G. Gemmell, Geigy Chemical corporation; Howard J. Grady, California Spray-Chemical corporation; Charles L. Hovey, Eastern States Farmers' Exchange, Inc.; Dr. Alfred Weed, Olin Mathieson Chemical corporation; and Wayne Yoder, American Cyanamid company.

Heading up the golf tournament will be J. H. Hoeffler, chairman, and Geo. Kerby, co-chairman. ▲

NAC CONVENTION PROGRAM

Wednesday, Sept. 7
"What the Future Holds for the Industry"
NAC President W. W. Allen presiding

10:00 a.m.
President's Address: W. W. Allen, maneger, agricultural chemicals sales, The Dow Chemical co., Midland Mich.

10:30 a.m.
"Major Trends in the Pesticide Industry," Warren Moyer, president, Chipman Chemical co., Bound Brook, N. J.

11:00 a.m.
"A Look Into the Economic Future," H. E. Luedicke, editor, The Journal of Commerce.

11:30 a.m.
"Safety Is Everybody's Business," A. W. Mohr, president, California Spray-Chemical corporation, Richmond, Cal.

12:45 p.m. Luncheon.
2:00 p.m. Guided tour of Walker-Gordon Dairy Farm.
6:30 p.m. Reception for members and guests, Essex & Sussex Ballroom.
8:00 p.m. Board of directors meeting.

Thursday, Sept. 8
"Research – Key to Future Growth"
NAC Vice President F. W. Hatch presiding

9:45 a.m.
Executive Secretary's Report: Lea S. Hitchner, Washington, D. C.

10:00 a.m.
"Industry Research Looks Ahead," Dr. John T. Thurston, director, Stamford Research Labs, American Cyanamid.

10:45 a.m.
"A New Approach to Agricultural Chemicals Public Relations," Professor G. E. Lehker, professor of entomology, Purdue University, Lafayette, Ind.

11:15 a.m.
"What Government Research Means to the Pesticide Industry," Dr. S. W. Simmons, chief, Technology Branch, US Public Health Service, Atlanta, Ga.

1:00 p.m. Golf tournament.
7:00 p.m. Annual banquet, Essex & Sussex Dining Room.

Friday, Sept. 9
"Up-To-Date Information on the Miller Amendment"
NAC President W. W. Allen presiding

10:00 a.m. "NAC Services to Associate Members," James D. Hopkins, president, Hopkins Agricultural Chemical company, Madison, Wisc.

10:30 a.m. PANEL DISCUSSION on Miller Amendment.
Winton B. Rankin, assistant to the commissioner, US Food and Drug Administration; Dr. W. G. Reed, head, Pesticide Regulations Section, Plant Pest Control branch, USDA; Dr. Charles W. Palm, head, Department of Entomology, New York State College of Agriculture at Cornell University. Moderator: L. S. Hitchner, executive secretary.

A New Approach to High Analysis Fertilizers

ONE OF the primary objectives of fertilizer industry research is the production of higher analysis fertilizers at a reduced cost to the consumer. This can be partially achieved by being enabled to produce high analysis phosphatic products (capable of chemically absorbing ammonia) at a lower cost per ton of plant food than the conventionally produced enriched superphosphates, triple superphosphate or combinations of normal and triple superphosphates now being used to manufacture the more concentrated mixed fertilizers.

Enriched Superphosphates

The enriched superphosphates of this process are produced by reacting various combinations of calcium metaphosphate, rock phosphate dust, sulfuric acid and water with subsequent mechanical or physical processing. The product should be conventionally "bin" or "pile" cured to promote substantial conversion of the rock phosphate.

We have experimentally manufactured these enriched superphosphates in conventional superphosphate equipment. The product grade range indicates extreme operational flexibility.

Although enriched phosphatic products ranging from an 0–21–0 grade to grades in excess of 0–50–0 have been prepared in the laboratory, our production efforts in conventional process equipment have been confined to the median portion of the range. We manufactured those grades that could easily be used in the manufacture of specific grades of mixed fertilizers. These enriched supers reflect a savings of approximately 14 cents per unit of P_2O_5.

One formulation for an 0–30–0 is as follows:

	% by Weight
Calcium metaphosphate (64%)	23.39
Rock phosphate (75% BPL)	42.08
H_2SO_4 (58°BE)	34.51
Surfactant (Sterox AJ)	.02
	100.00

An examination of the flow diagram of Figure 1 reveals the general details of the process. The rock phosphate dust, sulfuric acid, calcium metaphosphate and water are intimately mixed in the acidulator. Primary chemical reactions occurring in the acidulator are: hydrolysis of the calcium metaphosphate, the subsequent acidulation of the calcium metaphosphate hydrolysis product and the conventional acidulation of rock phosphate.

The hydrolysis of the calcium metaphosphate is promoted by the presence of sulfuric acid and water, the heat of solution of the sulfuric acid and heat of reaction of the acid and rock phosphate.

It is interesting to note that the sulfuric acid is not "used up" by the hydrolysis reaction but rather, with respect to that reaction, acts only to promote hydrolysis. The hydrolysis reaction runs concurrently with acidulation of the rock phosphate. With proper formulation and process conditions, hydrolysis is initiated quickly and proceeds rapidly, even though the sulfuric acid content of the reaction mixture soon begins to decrease as the rock phosphate is acidulated. Of course, the product of hydrolysis is monocalcium orthophosphate. This hydrolysis product will react with the sulfuric acid to produce two moles of phosphoric acid for each mole of sulfuric acid used up.

The reaction mixture is then transferred to a "den" (either batch or continuous). Further reaction between the rock phosphate and acid, moisture loss, crystallization of the products and gaseous product evolution occur during the "denning" phase of the operation.

Subsequent processing involves conventional excavation, transfer, and "pile" or "bin" cure of the product. The denning phase of the process can be eliminated by the selection of proper process equipment and the incorporation of a recently discovered process technique. Basically the operable process is dependent upon the hydrolysis of calcium metaphosphate.

The process offers the following advantages:

1. Reduces operational manufacturing problems.

New methods for converting calcium metaphosphate into high grade plant food were described by James Seymour, Illinois Farm Supply co. research chemist, at the 1955 American Farm Research Foundation. Through use of the Seymour process, collective name for the methods, metaphosphate is considered an ideal material for production of high analysis granular mixed goods and semi-granular superphosphates. In some cases a completely water soluble material is produced.

Basic reaction is hydrolysis of metaphosphate, already known under lab conditions but not previously shown practical in the plant. Work by IFS has shown several ways in which the reaction can be used under conditions readily obtained in the fertilizer industry. It is possible, says Seymour, to produce any common P, P-K, N-P, or N-P-K ratio by proper selection and utilization of one of the methods.

In this discussion by Seymour two of the several methods are described, one covering enriched superphosphate, the other mixed fertilizers.

2. Reduces the material or ingredient cost per unit of plant food.
3. Some enriched grades reduce both manufacturing cost per unit of plant food and transportation costs per unit of plant food.
4. The process is adaptable to and operable in conventional acidulation equipment.
5. Improved product quality—due to semi-granular composition (at no extra expense), low moisture content (the free moisture is utilized by hydrolysis of the calcium metaphosphate) and permeability.
6. Conservation of national sulfur resources.
7. Elimination of the "denning" phase of the process in manufacturing units to be constructed in the future.

The complexity of present manufacturing techniques and processes, the necessity of "pile" or "bin" curing the manufactured products for prolonged periods and the demand for a free flowing granular product represents a significant portion of the consumer fertilizer cost. A reduction in the cost or elimination of any of the above can result in savings to the consumer.

Mixed Fertilizers

The Seymour process mixed fertilizers are produced by reacting various combinations of calcium metaphosphate, sulfuric acid and water with subsequent ammoniation, potash addition and incorporation, drying, cooling, classifying and packaging. Pile or bin curing is not required for the manufacture of free flowing granular products by this process.

The lowest fertilizer costs possible through utilization of the Seymour process are not confined to savings accrued by elimination of the bin cure stage and by other improvements in process techniques and methods. Appreciable savings are also found in ingredient costs. The per unit savings will vary according to grade or formula variation. One example of ingredient cost reduction in an Illinois plant shows approximately nine cents per unit savings in a Seymour process high analysis 1–1–19 ratio when compared to a conventionally produced high analysis 1–1–1 ratio.

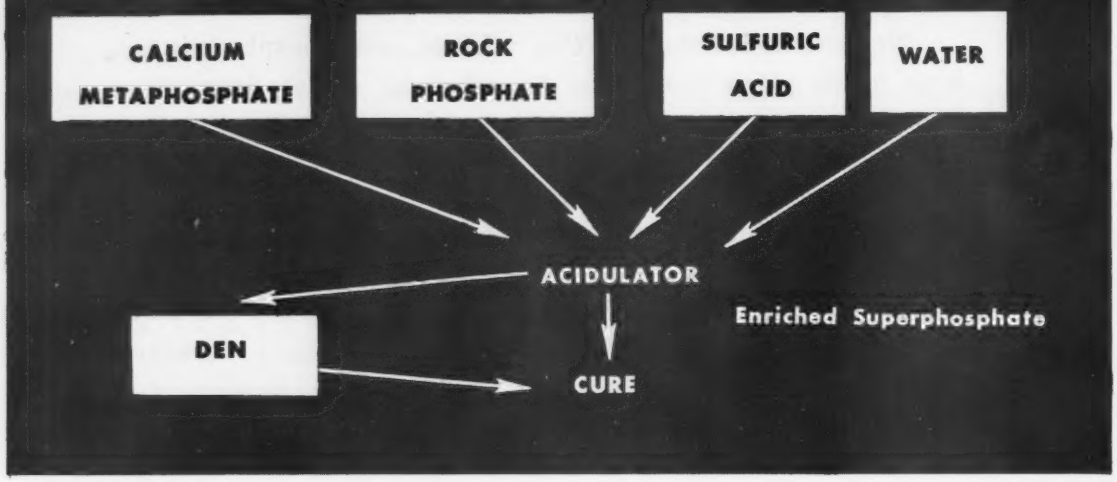
We have mentioned the feasibility of producing any common P, P-K, N-P or N-P-K ratio fertilizer by the proper selection of one of these processes. Extreme flexibility is possible through variations in formulations and ingredients. Example of high common ratios which have been experimentally produced in our pilot plant are 14–14–14, 6–24–24 and 10–20–20.

One 14–14–14 formula uses the following pounds of ingredients to manufacture one ton of product:

Calcium metaphosphate (64%)	441.6 lb.
Sulfuric acid (60°B.E.)	510.8
N Solution B (40.8%)	693.2
Potash (62%)	456.2
Water	60.0

An examination of the flow diagram, Figure 2, reveals the general details of the process. Calcium

FIGURE 1



metaphosphate, sulfuric acid and water are proportioned in various combinations into a mixer. The heat of solution of the sulfuric acid and the presence of this strong mineral acid promotes hydrolysis of the calcium metaphosphate.

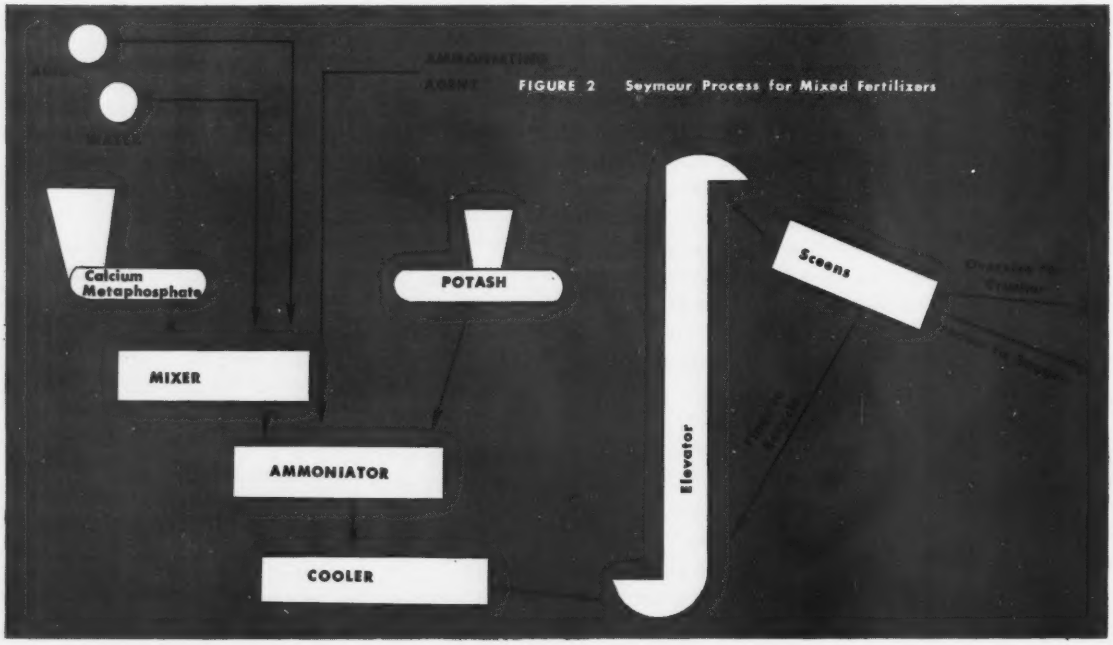
Subsequent sulfuric acid reaction with the calcium metaphosphate hydrolysis product yields two moles of phosphoric acid for each mole of sulfuric acid used. The hydrolysis-acidulation reaction mixture is transferred to an ammoniator and reacted with an ammoniating agent. A potassic ingredient may be added to the reaction mixture in the ammoniator if desired.

Both granulation of the product and partial drying of the product occur in the ammoniation phase of the process. Subsequent processing involves conventional cooling, transfer, classification and packaging.

The process offers the following advantages:

1. Produces a dry, granular, free flowing, high analysis, homogeneous product.
2. "Pile" or "bin" curing period is eliminated.
3. Utilization of less expensive ingredients.
4. High water soluble P_2O_5 values.
5. Utilization of the heat of reaction to dry and granulate the product (a costly external source of heat is not required.)
6. Extreme flexibility permits the easy manufacture of products of high analysis and conventional ratio.
7. Reduced "fixed" costs and labor costs.
8. Elimination of various other process phases necessary for the conventional manufacture of mixed fertilizers.
9. Conservation of national sulfur resources. ▲

FIGURE 2 Seymour Process for Mixed Fertilizers



Over $750,000 was paid by the New Nichols Fert. & Chem. company for Okla. Fert. & Chem. company and its Big Boy fertilizer plant. Products will be marketed through Nichols Seed co., Oklahoma City.

Nichols Buys Big Boy Fert. Plant

W. F. Nichols, Nichols Fert. & Chem. secty.-treas.; Earl Nichols, pres.; Lester E. Cox, Oklahoma Fert. & Chem. pres. and real estate broker Keats Soder.

The Nichols insecticide and organic-base fertilizer plant at Jones, Okla., includes seed treating unit.

Officers of the new company include Earl Nichols, president; Russell L. Pierson, vice-president; and W. Frederick Nichols, secretary-treasurer. Located at Lenox, Okla., the 50,000 ton Big Boy factory has been serving Oklahoma, the Texas Panhandle, Kansas and Nebraska with bulk and bagged goods since 1952

The Nichols brothers are also associated with Nichols Seed company, a leading farm supply concern with over 900 outlets in Oklahoma and surrounding states. Nichols Seed also operates an insecticide, seed-treating and organic-base fertilizer plant at Jones, Okla. ▲

Nichols retail store, distributor headquarters and warehouse in Okla. City.

Visiting Russians show interest in NH_3 fertilization; trade show draws spectators from corn belt section

GPAA Program a Success

IOWA farmers' keen interest in modern fertilization methods and a surprise visit by members of the Russian farm tour delegation combined to make the Great Plains Agricultural Ammonia Association's field day demonstration, "highly successful," according to B. A. Frankl, president of the group.

The event, held July 21 near Ames, Iowa, with the cooperation of Iowa State College, drew several hundred farmers from all parts of Iowa and from neighboring corn belt states. Demonstrations of NH_3 applicators were presented and the farmers viewed a two acre test plot showing a comparison of corn fertilized with varying amounts of anhydrous ammonia.

Professor C. J. Chapman, University of Wisconsin Soils dept., shows case histories of anhydrous ammonia fertilization to Tully Talbot, Chemco, Audubon, Ia., program chairman of Great Plains Agricultural Ammonia Association's two day trade show and field day program.

Wisconsin's C. J. Chapman, a featured speaker at the field day, continued to stress the need for nitrogen, the "limiting factor" in crop production. He pointed out that anhydrous ammonia provides the most economical method of supplying it.

"Nitrogen is the number one element our crops are crying for," he continued. "We have been pumping it out of the soil for 100 years and we are about 25 per cent deficient."

The Soviet agriculturists, arriving in the middle of the program, showed great interest in the many displays of anhydrous ammonia equipment that were on exhibit. They are reported to have questioned sales representatives at length about NH_3 fertilization, a practice almost unknown in Russia.

Others on the program included Dr. E. R. Duncan and Dale O. Hull, agronomist and extension agricultural engineer respectively, of Iowa State College.

The field day activities were held in conjunction with the Great Plains third annual Midwest Trade Show, conducted in Des Moines. This attracted over 400 representatives of anhydrous ammonia distributors, producers and equipment manufacturers.

Trade show participants heard addresses by the field day speakers and by Dr. John C. Strauss, vice president of the Liquidlizer corporation, Vincennes, Ind. Strauss told his audience that "the time for application of complete liquid fertilizers is here."

He emphasized the need for including all plant nutrients and cited the ease of application as one of the most popular features with farmers.

Plans for providing members with increased advertising, merchandising and publicity help were presented by Pax Shaffer, L. W. Ramsey advertising agency, who urged the group to become more advertising conscious. ▲

Factors Affecting Air Spray Distribution

AT THE Fourth Annual Texas Agricultural Aviation Conference, held early this year, Fred E. Weick and George A. Roth discussed some phases of work conducted under the Texas A&M Agricultural Aviation Program.

Of special interest are the comments of the two researchers, members of the Personal Aircraft Research Center, College Station, Texas, on spray distribution studies. This article is a slightly abbreviated version of that portion of the paper.

Previous spray distribution studies (1) have indicated the desirability of further investigation of the effects of airspeed, spray pressure and nozzle orifice size on spray droplet size. (Since any aircraft spray nozzle presently used produces a wide range of droplet sizes under each condition of operation, the term "median droplet diameter" (mdd) has been chosen as a arbitrary index of the range of droplet sizes. It represents a droplet diameter for which half the volume of spray is in smaller droplets and half in larger.)

A series of tests with individual nozzles were made during 1954 in which air speed, spray pressure and nozzle orifice size were varied. Equipment used consisted of Spraying Systems Teejet nozzles and a Piper PA-18A high-wing monoplane loaned by the Piper Aircraft corporation.

The spray pattern for each test was obtained by spacing parchment type paper samplers in a line at right angles to the airplane flight path. Dyed spray material (no. 2 diesel oil) was deposited on these samplers and, when dry, became a permanent spray pattern record. By counting and tabulating the various sized droplet spots in small areas across the total width of the pattern and knowing the size of droplets that produced the various sized spots, the range of droplet sizes was determined and the median droplet diameter calculated for each test.

Although these tests were not so comprehensive

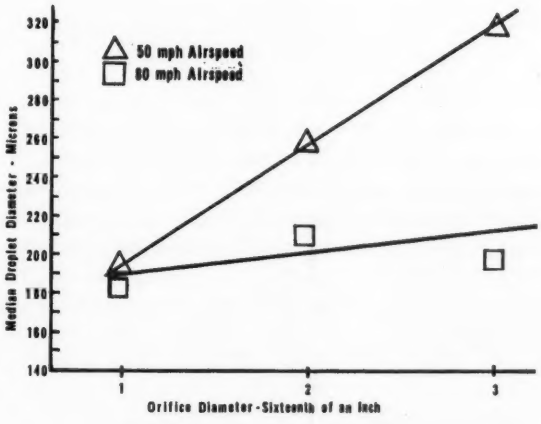


Fig. 1 Effect of Orifice Diameter on Median Droplet Diameter

Studies on effect of orifice diameter, spray pressure and air speed on droplet size of aerial spray material

as was desirable, they have given some very interesting results.

Orifice Diameter & Droplet Size

These tests were made with 1/16", 1/8" and 3/16" diameter orifices using 35 psi spray pressure. They have shown that, at a low (50 mph) airspeed, orifice size has a pronounced effect on spray atomization. As may be seen from Figure 1, there is a decided variation in mdd; tests made with the 1/16" orifice resulted in an mdd of 192 microns, 1/8"—258 microns and 3/16"—317 microns.

These results are in direct comparison to those obtained from a similar series of tests with same orifice diameters and spray pressure but at an airspeed of 80 mph. Figure 1 shows there was very little variation in mdd at this higher speed; the 1/16" orifice produced an mdd of 186 microns, 1/8"—210 microns and 3/16"—198 microns.

Considering the small difference between the median droplets from each of these orifices and the experimental errors involved, it is apparent that spray atomization was very nearly constant. This was true even though the largest orifice diameter was three times the smallest, indicating that relative airspeed was a paramount factor in spray atomization.

Effect of Airspeed.

Additional tests were made to determine effect of airspeed on atomization of spray fluid. Tests were made at 50, 65, 80 and 95 mph using the 1/16" orifice and 35 psi spray pressure. The results (Figure 2) show that an increase in airspeed did not greatly decrease the median droplet size for the 1/16" orifice; at 50 mph the mdd was 192 microns and at 94 mph it was 177 microns.

This slight variation in median droplet size is substantiated by the median droplet diameters which resulted from tests made at two intermediate airspeeds (Figure 3) and is further borne out by the effect of airspeed on the larger orifice size.

On Figure 3, for comparison, are the results obtained for the 3/16" orifice at two airspeeds. At 50 mph, tests resulted in a mdd of 317, and at 80 mph, 198 microns, a substantial decrease in median droplet with an increase in airspeed.

For the range of conditions tested, the larger the orifice diameter, the greater the effect of an increase in airspeed in reducing mdd and the greater the airspeed, the less is the effect of change in orifice size.

Fig. 2 Effect of Airspeed on Median Droplet Diameter

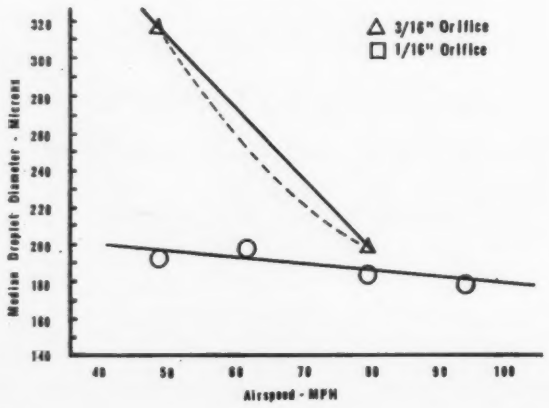
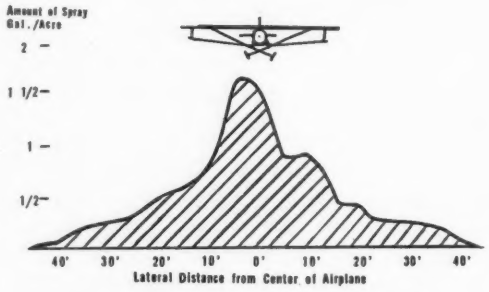
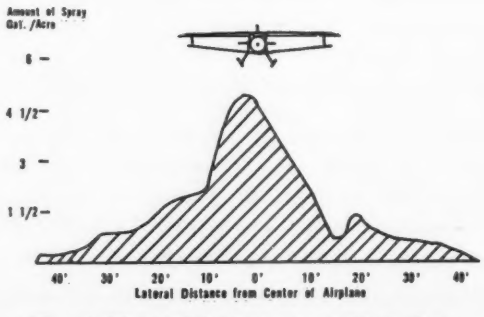


Fig. 3 Measured Spray Distribution From Arrangements of 43 Nozzles



3A. 43 SS 4664 D4-54 Nozzles (1/16" Orifice)



3B. 43 SS 4664 D8-45 Nozzles (1/8" Orifice)

It is evident that with an airspeed of as much as 80 mph, it should be possible to change orifice size in the nozzles of any particular arrangement and not seriously change the spray distribution except for application rate.

To prove this, measured spray distribution of several swatch checks of the same nozzle arrangement were compared under similar conditions with different size orifices.

Figure 3A represents the average measured spray distribution from an arrangement using 43 Spraying Systems 4664 D4-45 (1/16″ orifice) nozzles at 80 mph airspeed and a spray pressure of 35 psi. Figure 3B shows spray distribution measured under the same conditions with the larger D8-45 (1/8″) orifices.

It can be seen from the figures that the application rate for 1/8″ orifices was three times greater than for 1/16″ orifices, yet the shapes of the distribution patterns were almost identical.

Although no swath measurements were made using 3/16″ orifices, it seems likely that the distribution would be similar since the previous droplet analyses showed little change in spray atomization at 80 mph airspeed and 35 psi spray pressure.

It is not known to what extent the nozzle orifice diameter can be increased and still have these conditions of airspeed and spray pressure result in the same mdd. However, with a nozzle arrangement yielding the optimum distribution pattern, a wide range of application rates (gallons/acre) can be achieved by varying orifice size if airspeed is sufficiently high and spray pressure is constant.

Effect of Spray Pressure

It is generally accepted that spray system pressure is a significant factor in determining relative coarseness of spray obtained from a nozzle under airplane application conditions. For this reason the previous tests and results were obtained at the nearly constant spray pressure of 35 psi, felt to be a good average for a large part of the insecticidal type of aircraft spraying that is being done at present.

Unfortunately, lack of time precluded an extensive investigation of spray pressure effects on mdd, but results were obtained for the 1/16″ orifice at 80 mph airspeed. These results (Figure 4) indicate the inverse relationship that exists between spray pressure and mdd. At a pressure of 11 psi, the resultant mdd was about 200 microns; an increase in pressure resulted in a finer spray until at 50 psi, the mdd had decreased uniformly to 158 microns at the rate of about 10-11 microns/10 mph airspeed.

Actually, this is not a very great effect, for while spray pressure was increased 500 per cent, the mdd decreased only 20 per cent. It must be remembered that these results were obtained with the small orifice and that larger ones would probably have shown a considerably larger and more pronounced effect.

Nozzle Locations Near Wingtip

Previous investigation of spray pattern characteristics of different spanwise nozzle locations on a high wing airplane (1) indicated that, because of the wingtip vortex effect, no increase in swath width could be gained by use of nozzles placed on the outer three feet of the boom.

In addition, spray from these nozzle locations, 12 to 15 feet from the aircraft center, was more displaced by a crosswind. An effort was made to determine if swath width might be increased by use of nozzle locations nearer to or beyond the wingtip. Locations tested were 17 and 19 feet from the aircraft center and included positions two feet forward as well as two feet below the boom extension.

Results of these individual nozzle tests conducted with 80 mph airspeed, 35 psi spray pressure, S.S. No. 4664 D4-45 nozzles, wheel height of about seven feet and Diesel oil spray fluid, were directly comparable with results previously reported (1).

Such a comparison indicates that of six additional nozzle positions tested, only two show a substantial improvement in the probable swath width. Results for these two nozzle locations (17 and 19 feet from center and two feet below the boom) are presented in Figure 5 in comparison with a previously obtained distribution pattern for a nozzle location 12 feet from center.

Although results from outer nozzle positions indicate the possibility of obtaining a wider swath, data analysis also shows that the center of the spray pattern is greatly displaced with relatively small crosswind conditions.

This displacement may be as much as 14-19 feet per one mph crosswind, as compared to 5-8 feet displacement for the 12 foot nozzle position. So, under normal operating conditions which include a certain amount of crosswind, radical changes in swath distribution might be expected when using these outer nozzle positions.

Weick and Roth also reported briefly on studies conducted on the corrosion of aircraft structural materials by pesticide chemicals.

Corrosion Studies

Previous work at the center has shown that only two of the materials tested, type 302 stainless steel and polyester plastic reinforced with fiber glass, offered complete protection from all solutions investigated. It was also found that monel metal resisted corrosion reasonably well but that brass, aluminum

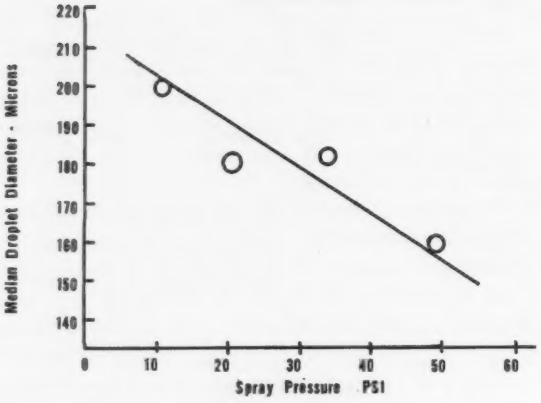


Fig. 4 Effect of Spray Pressure on Median Droplet Diameter

alloy and chrome-molybdenum steel were all destroyed by some of the chemicals.

A furan protective coating with a butyral primer demonstrated the best overall finish characteristics but none of the finishes tested withstood all chemicals without damage.

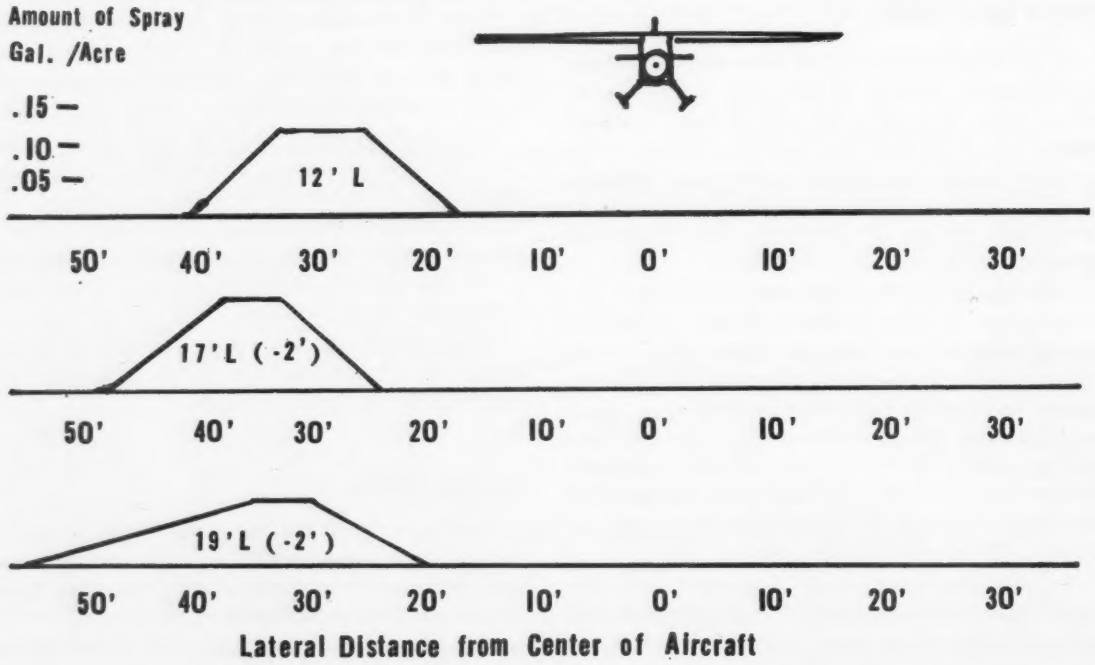
Last year some of the finishes were again tried and only one of the primers was found to adhere well to both aluminum and steel surfaces. This was a chromate base primer, 3-M Coro-Gard primer No. 9, which adhered better than an ordinary zinc chromate primer.

Carboline's gray furan finish gave the best all round protection against most pesticide chemicals but the primer coat did not adhere well to steel. Since this finish does adhere well to the 3-M primer, the current recommendation for the best single protection against all pesticides is the Carboline finish coat over the 3-M primer.

This, with regular cleaning, should provide reasonably good protection. No finish tested at the center was entirely unaffected by TEPP, parathion or aramite. ▲

1. Roth, George A. Factors Affecting Spray Distribution from a Light High-Wing Airplane. Personal Aircraft Research Center, Texas Engineering Experiment Station. Paper presented at the Third Annual Texas Agricultural Aviation Conference, College Station, Texas, February 22, 1954.

Fig. 5 Comparison of Typical Spray Patterns From Some Nozzle Locations on PA-18A Airplane



Government develops program to assure permanent fert. production

Plant Food Demand Soars In Mexico

By Emil Zubryn

Acapulco, Mexico

FERTILIZER demand in Mexico is soaring to new high levels as the republic develops its program of building up farm soils.

According to officials of Guanos y Fertilizantes, the government fertilizer producing corporation, the nation could use at least a half million tons annually.

Last year, with the Cuautitlan plant of the firm in full production, domestic output reached a total of 161,148 tons. Fertilizer imports totaled 58,097 tons, but this still left a partly unfilled immediate demand for nearly 300,000 tons.

Experts of the Department of Agriculture and Nacional Financiera feel that even the half million figure is not enough to build up Mexico's depleted soil.

Develop Federal Project

Preparing for all eventualities, the federal government, through Guanos y Fertilizantes, is going ahead with an ambitious project to assure "permanent fertilizer production" to meet all internal needs.

According to reliable sources close to the Department of Agriculture and Nacional Financiera (semi-official government credit agency), Mexico will invest 350 million pesos ($28,000,000) in an enormous fertilizer plant in Reynosa, in the state of Tamaulipas. The natural gas wells of Petroleos Mexicanos in this region will be used as prime material for production of ammonium sulfate and ammonium nitrate.

Apart from this new major plant, Mexico will also construct other plants in such key points as Monclova, Coahuila; Coatzacoalcos, Veracruz and Salamanca, Guanajuato. The existing installations of Guanos y Fertilizantes in Cuautitlan are also to be expanded. This heavy expansion program, expected to fully supply all Mexican needs, will require an investment of at least a billion pesos ($80,000,000).

The republic does not have all this capital available, and Nacional Financiera hopes to be able to obtain foreign loans, as well as the cooperation of direct foreign investors to make the project a reality. From 1949 to 1954 Nacional Financiera granted credits for $76,400,000 pesos ($6,112,000), with Export-Import Bank loans accounting for about half of this amount.

It was originally expected that Guanos y Fertilizantes production would be sufficient to reduce imports to a minimum. But the ever-growing realization of farmers here that fertilizers are beneficial has created a demand that has far outstripped domestic production.

Consumption Climb

The use of fertilizers in Mexico has increased in a spectacular manner in the past 10 years and especially within the past five. According to Nacional Financiera, the combined production of chemical and organic fertilizers in Mexico in 1950 came to only 28,682 tons. Last year's production in the Cuautitlan plant represented a 462 per cent rise in the past five years.

During the same five year period, imports rose to 58,097 and the value of fertilizer imports jumped from 7 million pesos ($560,000) in 1950 to 48,400,000 pesos ($3,872,000) in 1954.

Mexico is still importing phosphate rock from Florida for production of superphosphates as well as potassium fertilizers. The Cuautitlan plant, using natural gas from Poza Rica fields, for production of 80,000 tons of ammonium sulfate, almost met present Mexican needs for nitrogen fertilizers.

Total consumption of fertilizers last year, according to estimates by the Department of Agriculture,

came to around 260,000 tons. This included 114,000 tons of ammonium sulfate; 122,000 tons of superphosphate; 10,000 tons of bone meal; 1,400 tons of bird guano; 3,000 tons of bat guano and oil paste; 5,000 tons of potassium chlorates and 5,000 tons of nitrophosphates and other fertilizers.

Guanos y Fertilizantes

The Cuautitlan plant, located in the state of Mexico, is the largest chemical fertilizer plant in Latin America, and will be surpassed only when the new Reynosa plant is erected. Actually, Guanos y Fertilizantes was set up by a presidential decree in 1943 with an initial capitalization of 10 million pesos, advanced by Nacional Financiera, to exploit deposits of bird guano on the Baja California peninsula and the Pacific coastal islands.

There was expectation that production of guano would attain a 200,000 ton annual average within five years. However, deposits of guano left by sea birds were not built up as rapidly as along the coasts of Peru, and production amounted to but 2,000 tons the first year and fell to 1,500 tons the following year, a figure which has remained more or less the same since then. Experts have theorized that birds along the Mexican coast must fly farther for their food supplies so that much of the guano is lost on over-water flights.

The discouraging failure to produce large quantities of natural guano turned official thoughts to manufacturing of chemical fertilizers. Today the Cuautitlan plant is using three million cubic feet of natural gas in its operations daily.

The government fertilizer corporation has another plant in San Luis Potosi for the production of phosphate fertilizers, and another installation in the Villa de Guadalupe section of Mexico City which processes by-products of the meat packing industry to produce bone meal as well as tallow and glue.

Publicity Efforts

Reason for the heavy trend toward fertilizers is wide publicity federal agencies give to high yields. Last summer, for example, they publicized the unusually high corn yield on the Los Amigos ranch of Senator Jose Rodriguez Claveria. One plot of fertilized land produced 3,000 kilograms of corn per hectare as compared with an 800 kilogram yield of an unfertilized section. This is something that illiterate campesinos can understand, for it means more corn for hungry mouths and money in the bank.

Apart from the vast expansion plans envisaged by the federal government through its fertilizer monopoly, Mexico City's Federal District Government is looking into conversion of sewage waters and garbage into 1,000 tons of fertilizer daily. This, officials state, would mean at least an $8,000 daily income for the city, figuring a price of 100 pesos ($8) per ton. However, the only hitch is that the processing plant would cost 100 million pesos ($8,000,000) and the city cannot afford to spend this money. The hope is that private investors may be interested in the idea, with the city offering every facility, including tax exemption for a term of years. However, so far no bids for concession rights have been tendered to the city government. ▲

Plant Safety Tip #3

A Stuck Cable

The Accident During the early afternoon of a day early in March, 1954, a fertilizer plant laborer sustained an accident which resulted in permanent disability of his third left finger.

He was helping to store empty bags on the second floor of a building, using a hoist in conjunction with a tractor scoop. During the operation the cable became caught in the tractor scoop latch and, in his effort to free it, the finger was broken.

Instead of using a stick or other object to work on the trouble spot he used only his hand. The injury was compounded when the employee removed the splint placed by a doctor on the finger with the result that the member stiffened when the injury healed.

Cause Although the direct cause was the stuck cable, it could have been freed without injury had the worker used some object to loosen it.

Action Taken Men were instructed never to use their hands in such a situation, obtain a stick or other object. They were also advised to follow the doctor's orders, not their own inclination, on removal of a bandage or splint.

Calspray officials L. R. Gardner, E. W. Cannon, A. W. Mohr, C. E. Cody, Leslie Hamilton, P. S. Williams and Calvin Dorough look over plans for filling plant site.

Begin Cal-Spray Fert. Units

FERTILIZERS designed specifically for Western soils are scheduled for production by California Spray-Chemical corporation beginning next summer. The firm has scheduled construction of four plants at Richmond, Calif., as part of the $16 million dollar, six plant fertilizer project of Standard Oil of California and its subsidiary, Calspray.

Earth moving has already begun at the site which is being dredged by Associated Dredging and later will be filled by the Walso Construction company.

Chemical and Industrial corporation, representatives of the French Potasse et Engraise Chimiques, received the contract for the pellet complex fertilizer plant and the ammonium nitrate solution plant. The PEC unit will be the first constructed off the European continent.

Using Western raw materials, the new facilities will produce, in addition to high analysis pelleted fertilizers and ammonium nitrate solutions, ammonium sulfate, anhydrous ammonia and aqueous ammonia.

The need for such facilities is evident, says Calspray, from a demand far greater than plant food manufacture in the West, a direct result of the vigorous growth of agriculture throughout the region.

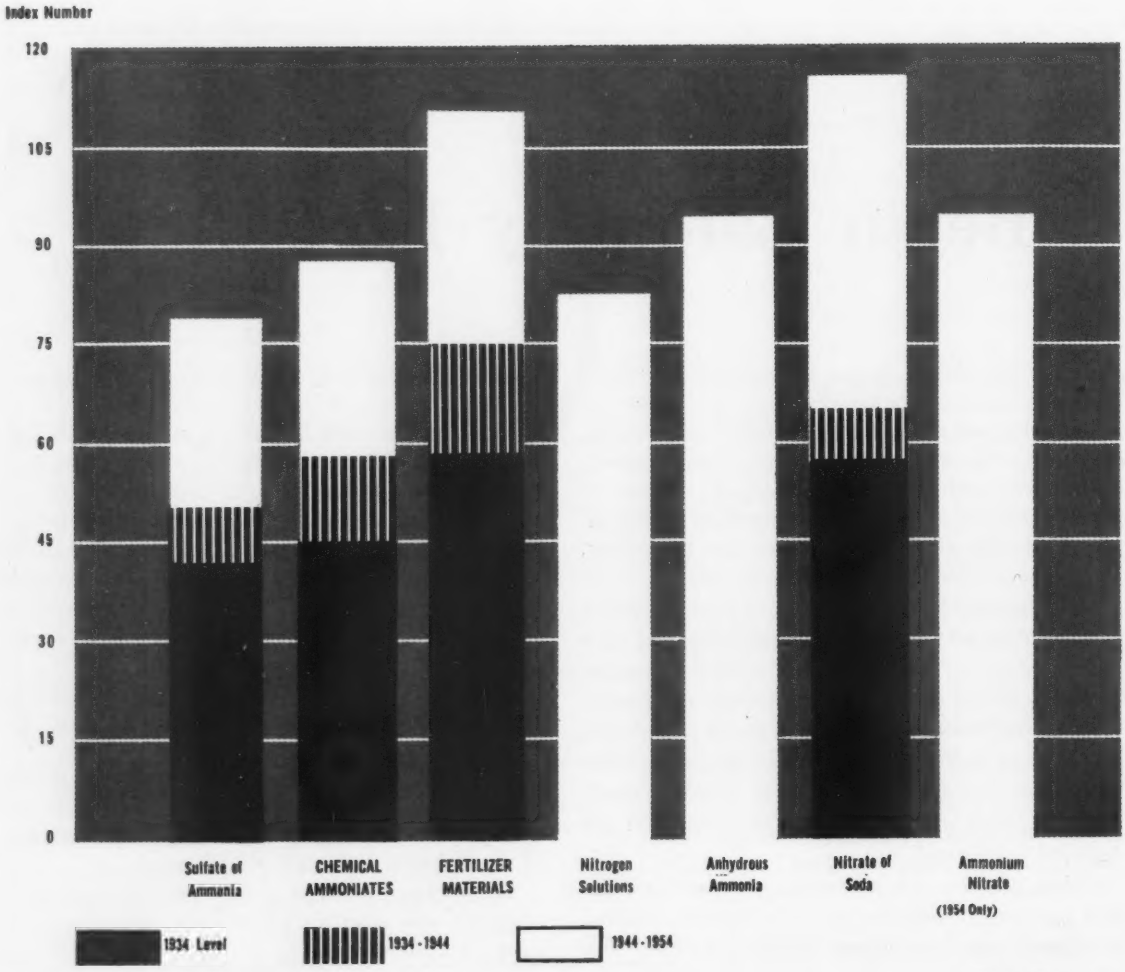
Shortages which developed during periods of heavy fertilizer usage, it points out, have in the past made it necessary for Western farmers to bring in plant foods from Eastern states and foreign countries with accompanying heavy freight rates.

The new plants, says Calspray, will be ideally located for servicing the region with facilities for water, rail or truck shipments to the farmer.

Calvin C. Dorough has been appointed superintendent, fertilizer manufacturing, and will head the new project according to Frank L. Jucher, manager of the Calspray manufacturing department.

Former plant manager at Best Fertilizer company, Dorough was raised in Little Rock, Ark., and educated in California. ▲

A New Revision of the Fertilizer Price Index



PRICE index numbers of basic fertilizer materials have been revised by a University of Maryland researcher to include new materials and to weight the index according to current consumption figures. Financed in part by a grant from the American Potash Institute, the study is aimed at providing a more realistic picture of the comparable prices of fertilizer materials.

Paul R. Poffenberger of the Department of Agricultural Economics and Marketing at Maryland's Agricultural Experiment Station points out that the numbers were last revised in November, 1952. Many changes have occurred since that date with new materials of increasing importance and usage differing markedly.

From USDA's "Fertilizer Situation for 1953-54," quantities of materials used were determined for weighting purposes in the construction of index numbers, and prices were obtained from American Potash Institute records and Oil, Paint and Drug Reporter.

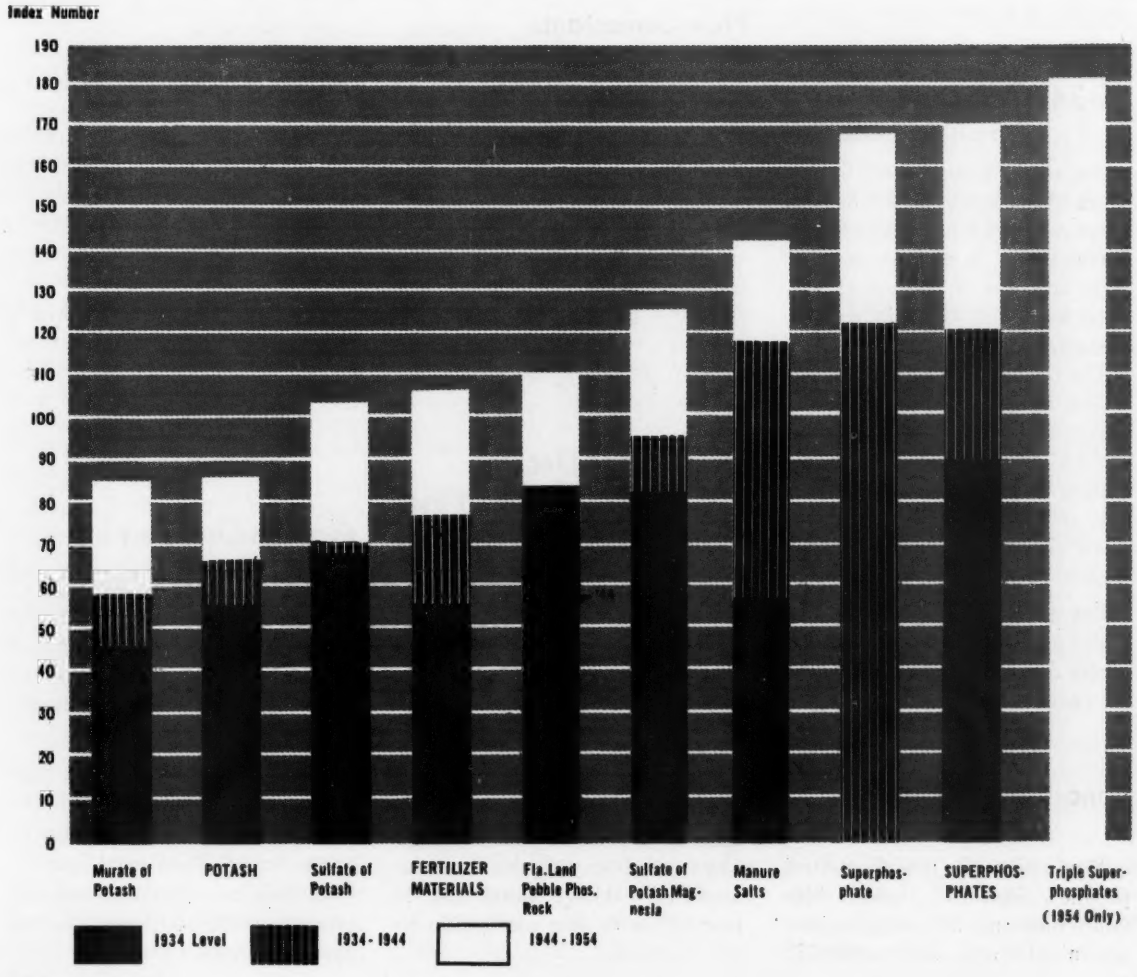
For periods in which potash salts were reported on an f.o.b. basis, prices have been adjusted to a port basis by accounting for freight charges. Potash prices are included at maximum discount levels for the year because of the large quantities sold on that basis, presenting a realistic indication of potash prices on a use basis.

Weighted index numbers were computed with 1947-49 equal to 100 and these series converted to a base period of 1910 to 1914 equal to 100. This placed the revised index on a comparable basis to index numbers of agricultural commodity prices and other price series relating to agriculture.

They were computed separately for nitrogen, phosphate and potash and the groups were then combined into an overall index of prices of fertilizer materials.

New materials added to the index—triple superphosphate, nitrogen solutions, anhydrous ammonia and ammonium nitrate—were not included until the supply year in which supply had increased sufficiently in relation to demand and the prices per unit were relatively stable. ▲

From "Revised Index Numbers of Prices of Fertilizer Materials," by Paul R. Poffenberger, Misc. Publication 230, Dept. of Agr. Econ. & Mktg., Univ. of Md., Agr. Expt. Station.



Chemicals

RS-342 Fumarin ACP Rodenticide

American Chemical Paint co. has announced a new rodenticide, Ratafin, based on the new anticoagulant chemical, Fumarin.

According to ACP, the chemical has been used for several years in a number of foreign countries and has proved exceptionally effective and economical.

Ratafin kills painlessly and rats die after eating it over a period of from five to fourteen days without alarming the rest of the rat population. ACP says the chemical causes no bait shyness and rats continue to eat until exterminated.

The material is available to formulators in concentrated form.

For more information, circle 342 on Reader Service card.

RS-343 Tetrines & Emulsion Stability

One of the factors contributing to emulsion instability which is frequently overlooked, says Glyco Products co., is the presence of trace amounts of polyvalent metallic ions such as calcium, magnesium, iron and copper.

The tetrines, commercially pure grades of ethylenediamine tetraacetic acid and its sodium salts, chelate and sequester contaminating polyvalent metallic ions. The tetrines form water soluble metal chelates inactive to further chemical reaction.

For a full description of the effect and use of these agents, circle 343 on the Reader Service card.

Sano-Bait for Flies Released by Tyklor

Production of a new fly control product, Sano-Bait, which kills adult flies and fly maggots in a few minutes and continues to kill adults for days, has been announced by the Tykor Products div., The Borden co.

Consisting of small flakes, the new product is packaged in five pound cans, 25 and 100 pound kegs.

FDA Tolerances

FDA has tentatively approved establishment of a residue tolerance of 20 ppm for captan on certain fruits and vegetables and a tolerance of 0.1 ppm for heptachlor residues on specified vegetables.

A petition has been filed by Stauffer Chemical co. for establishment of a tolerance of 15 ppm for residues of Sulphenone (p-chlorphenyl phenyl sulfone) on apples, peaches and pears.

New Surfactants Available from CSC

Commercial quantities of three new surface active agents, Alkaterge-A, -E and -T, are now available from Commercial Solvents corp.

Differing somewhat in individual properties, the new alkaterges can be expected to find uses as auxiliary emulsification, dispersing and spreading agents.

DDT Value Declines For Cabbage Pests

DDT, which gave almost complete control of cabbage worms when it was first introduced, now is reported to have doubtful value in New York cabbage fields by the N. Y. Agricultural Experiment Station at Geneva.

For the past nine years, Cornell entomologists have been observing the steady decline in effectiveness of DDT for the cabbage looper, and they report that the imported cabbage worm also is proving to be less susceptible to the chemical.

Shell Lowers D-D Distributor Price

Because of an increase in D-D production from Shell Chemical corp.'s Norco, La., plant, the firm has reduced the distributor price of the soil fumigant from $1.20 to $1 per gallon, F. W. Hatch, manager of the Agricultural Chemicals div., recently reported. The price reduction applies to D-D sold in 55 gallon drums, delivered by carload or full truck load.

Hatch also said the company will introduce, later this year, a new 30 gallon container. In carload and full truck loads D-D will be sold for $1.05 a gallon in this container.

3-Cl-IPC Promising As Sprout Inhibitor

USDA plant physiologists report further progress toward development of a superior sprout inhibitor for use on stored potatoes. The best of several organic chemicals thus far tested at Beltsville is 3-chloro-isopropyl-N-phenyl carbamate, referred to as 3-Cl-IPC, according to the researchers. The material, which proved effective at a low dosage rate, is not yet recommended for use by commercial growers and handlers.

Acrylon Dropped by American Cyanamid

Manufacturing and marketing of Acrylon fumigant recently was discontinued by American Cyanamid co.'s Agricultural Chemicals div.

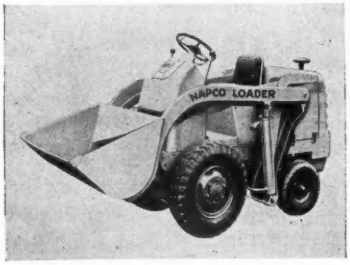
The firm has advised its customers that they can obtain the same fumigant under the tradename Acritet 34-66 from Stauffer Chemical co., producers of the product under a patent license agreement with Cyanamid.

Equipment & Supplies

RS-344 New Napco Front End Loader

A newcomer to materials handling equipment is the Napco Loader, Model NL-50, 15 cubic feet, front end loader. With front wheel drive and rear wheel steering, it is designed for handling all bulk materials, states Napco Construction Equipment, a division of Napco, Inc., the manufacturer.

The loader features a 7'4" turning radius to the outside of the bucket. This short turning radius, a low center of gravity and good balance, Napco claims, gives the



loader extremely high maneuverability for swinging through box car doors and in and out of tight spots. Maximum lift of 7'6" under the bucket hinge enables the loader to dump into hoppers and high truck boxes. Lift capacity is 1,250 pounds. Bucket tilt-back at ground level is 35 degrees.

No-clutch shifting for directional control is also featured. Shifting from forward to reverse is done without clutching by an easy-throw conveniently positioned lever. A heavy duty planetary-type transmission is directly coupled to the engine eliminating the engine clutch.

For further information, circle 344 on the Reader Service card.

Fletcher 'Utility' Certified by CCA

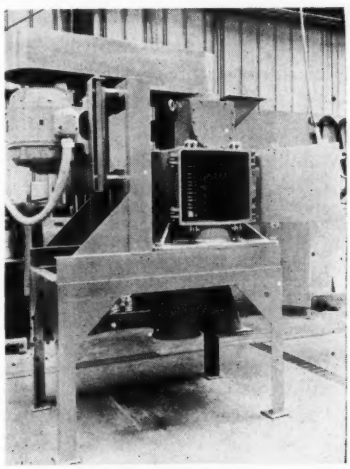
The Fletcher FU-24 "Utility" has been officially certified by the U.S. Civil Aeronautics Administration as the first agricultural, cargo-carrying and passenger-carrying aircraft ever to be licensed in this country, Wendell Fletcher, president of Fletcher Aviation corp., has announced.

Powered with a 225 hp Continental air-cooled engine, the Utility has a 42-foot wing span, tricycle landing gear, a 31 foot, 10 inch fuselage and weighs 1909 pounds empty.

Major Changes for Rietz Disintegrator

Newest model added to the Rietz Disintegrator line incorporates major changes in design and operation to widen application of this type of equipment to the general field of continuous grinding, mixing and size reduction, according to Rietz Mfg. co.

The change to a side-mounted belt-driven motor gives the disintegrator variable speed operations from 1,200 rpm to a maximum of 5,000 rpm, utilizing a 3,600 rpm motor of from 30 hp to 125 hp with two sets of belts and four pulleys. This combination



allows six different speed ranges, with a changing time of less than 30 minutes.

First of the new models to complete its tests is the RD-18-H32 and 18" rotor diameter unit, illustrated above.

RS-345 Henderson Chief Transport

Every feature of the Henderson Chief Bulk Transport, from the type and positioning of controls to the self-unloading mechanism,

is especially designed and efficiently engineered for easy, one-man operation, reports Henderson Manufacturing co.

Already in operation in several areas of the country, the Chief Transport self-unloads direct into Chief Spreaders.

A 14-foot swivel conveyor swings in a 156 degree arc around the back of the transport. Advanced Hydra-Mech action raises, lowers or folds the conveyor vertically for over-the-road transport.

For more information on the units, which are available in 18 foot to 36 foot lengths, circle 345 on the Reader Service card.

RS-346 Senesac-Schelm Applicator

Arrangements have been made by Schelm Brothers, Inc. with W. A. Senesac for Schelm to manufacture and distribute on a national basis the Senesac "Do-It-Yourself" liquid nitrogen applicator.

Harold Schelm reports that Senesac will work with the company in further development and engineering of the applicator.

Furnished with a 100" tool bar and equipped with four knives, the applicator is also available with extension arms to make it into a five knife unit.

For more information on the "Do-It-Yourself" applicator, circle 346 on the Reader Service card.

RS-347 Fischbein's New Portable Closer

The new Fischbein Portable will close from the lightest to the heaviest textile or paper bag,

whether asphalt treated or specially processed, with no change in parts or adjustments.

Electrically powered by a 1/12-horsepower motor, the machine weighs only 10½ pounds, including full cone or thread, and sews 40 feet a minute.

Fischbein reports the portable is being used in about 45 countries throughout the world.

For further details circle 347 on the Reader Service card.

Casters for Torit Dust Collectors

All Torit dust collectors of both cabinet and cyclone type are now available with casters as optional equipment, Torit Mfg. co. reports. Made of hard rubber, 3″ in diameter and 1″ wide, the casters are welded to the bottom of each unit at the factory.

Dolly, Swivel type Penco Pallet Rollers

The new Penco Pallet Roller is manufactured in both a dolly-type and a swivel-type for movement of palletized loads on production lines, warehousing and for all loading and unloading operations. The dolly-type is designed for two way direction and is made to 2,000 and 4,000 pounds capacity, while the swivel-type turns easily and quickly and is made in 4,000 pound capacity only.

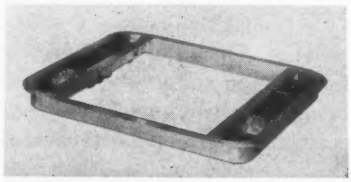
New Brake System For Y&T Worksaver

Worksavers produced by Yale & Towne Mfg. co. can now be equipped with dynamic braking, an extra, smoothly applied braking force for positive speed control when descending ramps under heavy loads, reports the manufacturer.

Dynamic braking is applied by pushing a button on the Worksaver handle and then reversing direction control making in effect a brake out of the motor itself.

Redesigned Magcoa Dollies Available

Features of Magnesium co. of America's redesigned magnesium pallet dollies include extruded magnesium frames, hardened steel



axles and phenolic resin rollers with factory-lubricated sealed bearings.

Although the new dollies are available in capacities to 4,000 lbs., the average model weighs only 37 lbs. Sizes range between 36″ x 36″ and 48″ x 48″.

Rhodia Adds Two Chem. Reodorants

Alamask CPM-55 and Alamask CPM-55-X, new additions to Rhodia, Inc.'s line of chemical reodorants, have been developed primarily for use in the fertilizer, rendering, fat processing, fish and allied industries.

Stronger than previous Alamask reodorants, they offer lower cost of application, the manufacturer reports.

RS-348 Finish X for Kromer Spray Units

The messy, time-consuming and wasteful job of cleaning spraying equipment each night to prevent corrosion has now been eliminated by means of a new metal coating called Finish X, available on Kromer sprayers, states O. W. Kromer co.

Even though chemical solutions and liquid fertilizers are never drained from the tank, or the system flushed during an entire spraying season, Kromer claims no rust, corrosion or pitting will occur.

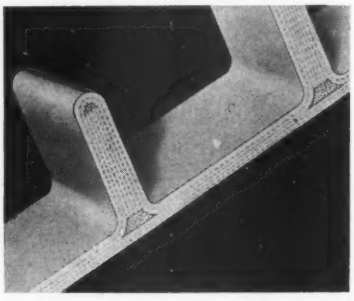
Further information is available by circling 348 on the Reader Service card.

RS-349 Conveyor Belt With Cleats

A. J. Sparks Belting co. says its cleated conveyor belt for incline or decline conveying is new and different—a fabric reinforced cleat with no joints, no cracks, no gaps. The cleat and the body of the belt are one solid piece.

Sparks Cleats can be made any height, width and spacing, and as stiff or as flexible as desired. They will flex around pulley diameters, compatible with weight of the belt.

Available in white, tan or black, they can be supplied in rubber,

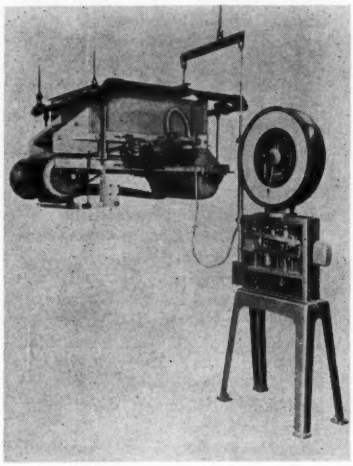


neoprene or special compounds for resisting grease, oil, juices, chemicals, etc.

For more information, circle 349 on the Reader Service card.

Richardson Scale For Sticky Chemicals

Richardson Scale co. says its new automatic scale weighs sticky and non-free flowing materials as accurately as dry aggregate materials. A differential scale, the unit automatically and continuously



delivers a selected amount of material, the weight of which is the difference between a fully loaded and partially loaded scale.

Called a weigh-in and weigh-out scale, the unit is made up of a weigher, dial scale and totalizer. The weigher, consisting of a weigh hopper mounted on a short belt conveyor, is suspended from levers terminating in the dial scale.

Torsion Balance Speeds Weighing

A new durable laboratory balance with features to simplify and speed up weighing operations has been announced by Torsion Balance co. The features include torsion bands of Elgiloy, a stronger, corrosion resistant alloy, and a single beam with vernier for accurate weighings from 0.01 gm. to 10 gm. without use of loose weights.

Capacity is 200 gm., and the sensitivity reciprocal is 0.02 gm. The balance is equipped with a 5″ removable stainless steel weighing pan.

Suppliers' Briefs

American Wheelabrator & Equipment corp. has changed its corporate name to Wheelabrator corp. The move does not involve any alteration in ownership, management or operation of the firm.

Chase Bag co. personnel changes: David C. Wyland has been appointed assistant superintendent at St. Louis; A. Wellford Garret has been transferred to Chase's Crossett, Ark., branch, and Robert H. Biehl has joined the firm's Industrial Engineering dept. at St. Louis.

Continental Can co. Three four year, $1,000 annual scholarships recently were awarded to James B. Conklin, Jr., Paul Meyer and Michael W. Kuhlmann, children of Continental Can employees, from the Carle C. Conway Scholarship Foundation.

The company recently appointed D. N. Rabishaw manager of purchases for coatings and chemical products; J. J. Sherlock, manager of purchases for paper and petroleum products; and Dr. Frederick W. Adams, director, Department of Chemistry, Central Research and Engineering div.

Fulton Bag & Cotton Mills new million dollar plant at New Orleans was dedicated in July, before a large group of business and civic leaders, Fulton customers, company officials and employees. Located at 1400 Annunciation St., the plant was begun in October, 1953. It measures 296 x 715 feet and contains 212,000 sq. ft. of area, is constructed of steel trusses with a cement foundation and floor.

Visitors on tour of Fulton plant view rolls of burlap which are awaiting use on a textile press.

Aerial view of Fulton's new plant.

Gilman Paper co. promotions: Larry K. Norton to assistant vice president and sales manager, Standard Products div.; Homer Lake to assistant vice president and sales manager in charge of bleached and unbleached pulp and specialty papers; F. L. Munger to vice president and sales manager of Kraft Bag corp., a Gilman subsidiary.

Hudson Pulp & Paper corp. Installation of a nuclear scanning device at the Palatka, Fla., mill to observe and regulate the quality of every foot of the firm's kraft paper, recently was announced. It is expected that the nuclear scanner will regulate the basis weight to a variance of less than 2 per cent.

International Paper co. has named C. B. McCord plant manager of its three multiwall bag plants, replacing S. D. Andrew who retired July 1 after 26 years with the firm. Concurrently, T. A. McCord was named assistant plant manager of the Camden, Ark., Bastrop, La. and Mobile, Ala. plants.

Vulcan Containers Inc., a new organization, has been formed by consolidation of Vulcan Stamping and Manufacturing co. and Vulcan Tin Can co.

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Calendar

Sept. 7-8—Corn Belt Anhydrous Ammonia conf., Univ. of Ill., Champaign-Urbana campus, Urbana.

Sept. 7-9—National Agric'l Chemicals Assoc. annual meeting, Spring Lake, N. J.

Sept. 7-9—9th annual Beltwide Cotton Mechanization conf., Texas A & M College, College Station, Tex.

Sept. 11-16—American Chemical Society, National meeting, Univ. of Minn., Minneapolis.

Sept. 22-23—Chemical Market Research Assn., Cavalier hotel, Virginia Beach, Va.

Sept. 28-30—New England Fert. conf., Poland Spring House, Poland Spring, Me.

Oct. 3-5—Carolinas-Virginia Pesticide Formulators Assn., inc., annual meeting, Holly Inn, Pinehurst, N. C.

Oct. 11—Western Agric'l. Chem. Assn., annual meeting, Hotel Claremont, Berkeley, Calif.

Oct. 17-18—Fertilizer section, National Safety Congress, LaSalle hotel, Chicago.

Oct. 18-20—Canadian Entomological Society of America, Fredericton, B. C.

Oct. 27—Middle West Soil Improvement Committee annual business meeting, Sherman hotel, Chicago.

Nov. 2—Annual convention, Pacific Northwest Plant Food Assn., Pilot Butte Inn., Bend, Ore.

Nov. 3-4—Northeastern div., American Phytopathological Society, Eastern Farmers Exchange, Inc., 27 Central St., W. Springfield, Mass.

Nov. 4—Fertilizer section, S. C. annual Accident-Prevention conf., Hotel Francis Marion, Charleston, S. C.

Nov. 7-8—Calif. Fert. Assn. 32nd annual convention, Hotel Mark Hopkins, San Francisco, Calif.

Nov. 8-11—American Council of Independent Laboratories annual meeting, Westward Ho hotel, Phoenix, Ariz.

Nov. 17-18—Nitrogen Solution field day, National Nitrogen Solution Assn., State Armory, Springfield, Ill.

Nov. 29-Dec. 2—Entomological Society of America, Netherlands Plaza hotel, Cincinnati.

Dec. 5-7—Agric'l. Ammonia Institute, Kansas City, Mo.

Dec. 5-7—Chemical Specialties Mfrs. Assn., annual convention, Roosevelt hotel, New York City.

Dec. 8-9—Michigan Fert. & Lime conference, Michigan State College, East Lansing.

Dec. 15-16—Beltwide Cotton Prod. conf., Hotel Peabody, Memphis, Tenn.

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Presented in cooperation with the Economic Insect Survey Section, Plant Pest Control Branch, Agricultural Research Service, USDA.

Corn Borer Threat Continues

THE European corn borer continues to be a rather serious threat in some areas. Illinois may have the largest population of second-generation borers on record for the state and damage may also be the greatest. By early August egg masses were 50 100 per 100 stalks with counts in some fields reaching 500 masses per 100 plants and more egg laying expected, probably into September. Egg mass counts were highest in Woodford, Livingston, Ford and adjacent counties.

In Iowa, moths have been flying for the past month and second-brood egg masses have accumulated to a total of 70 masses per 100 plants in some areas. Third instar larvae are present in some fields and there is a good likelihood of an overlapping second and partial third brood. The second brood is expected to be rather general over the state in corn of practically all planting stages.

The situation in Wisconsin is attracting more attention than usual this year. Early corn is expected to receive serious injury with some counts running more than 100 borers per 100 stalks. By early August the second brood was just beginning to hatch.

The highest infestation in Minnesota was in the southwest district. Moth emergence in the state had been slow but was expected to increase by the middle of August. A long egg laying period is indicated in North Dakota.

First-generation pupation averaged 10 per cent in the southeastern area with 75-90 borers per 100 stalks. In the central and eastern counties of South Dakota the average was about 37 borers per 100 plants with 66 per cent being in the fifth instar. The first egg laying was expected in Nebraska during the week of August 8. The larval instars ranged from one to five in late July so a prolonged egg laying period can be expected. Reports received from the Eastern states indicate a rather low population.

Of concern is the finding of the European corn borer in some additional Alabama counties. Recent surveys revealed the borer for the first time in the Alabama counties of: Blount, Cherokee, Colbert, DeKalb, Franklin, Jackson, Lawrence, Limestone and Morgan. The insect has also extended its range in Arkansas having been taken for the first time in White county.

Corn Earworm

The corn earworm (*Heliothis armigera*) has been very abundant in early sweet corn throughout the southern area of Wisconsin. Damage has been heavier than for many years with all of early sweet corn damaged and threatening to cause considerable damage to field and late sweet corn.

Southern Delaware had a moderately heavy infestation in most sweet corn and in Maryland heavy damage was reported from some fields in Montgomery and Baltimore counties. New Jersey, Virginia, North Carolina and New Mexico also reported serious corn earworm damage in local areas.

Corn growers in eastern Colorado were becoming concerned about existing infestations. In some Logan and Providence, Utah, areas, cornfield damage exceeded 50 per cent. The Gilbert, Arizona, area, reported 50 per cent ears infested.

This insect was also causing damage to grain sorghums in several states. In Texas, sorghums were being attacked in Tom Green, Lamar, Schleicher, Denton and Bell counties, as well as other local areas. Up to 14 larvae per sorghum head were recorded in the central Arkansas River valley of Arkansas. On the encouraging side, however, were reports from Idaho and Massachusetts. Southeastern Idaho had the lowest counts in four years with the highest infestation being two earworms per 100 ears. The infestation was lighter than usual in southeastern Massachusetts.

Grasshoppers A Problem in Some Areas

The cooperative program for the control of grasshoppers on rangelands has just about been completed with over one and one-half million acres being treated, but infestations in crop lands continue in some areas. Grasshoppers have been rather general in Missouri during the season, and during early August heavy damage was still occurring to several crops in the west central, northwest and northeastern areas of the state. Disease and parasites were aiding in reducing populations in the central and south central areas.

Populations have been heavy throughout Minnesota. In the

southwestern area populations in orchard cover crops were threatening new trees, and in some fields in the northwestern area up to 25 per cent of the alfalfa had been destroyed by early August. Populations in Wisconsin have been rather high in some areas. Several hundred hoppers per square yard were recorded in Lafayette and Grant counties with stops over the state averaging over 25 per square yard.

Damage or potential damage to crops from grasshoppers was also reported from Colorado, New Mexico, Kansas, North and South Dakota, Texas, Arkansas, Illinois, Iowa, Tennessee, Florida, Maryland, Delaware and New Jersey.

Other cereal and forage insects which attracted attention during late July and early August included the fall armyworm, which was becoming active in Colorado, Kansas, Missouri, Arkansas, Virginia, Maryland and Delaware. This insect was also active in Puerto Rico, causing damage to young cane, seedling horsetail beefwood, corn, tomatoes and pastures.

Yellow Clover Aphid

The yellow clover aphid which decreased some during the early summer is on the build up again in some areas. Rapid increases are reported from Tulare and Kings counties, California. Heavy infestations were in Imperial and Kern counties. Local increases were noted in Arizona, New Mexico and Utah, and several new county records were reported from Utah. The yellow clover aphid was reported from Arkansas for the first time, having been taken July 12 from a mixture of crimson clover and alfalfa in Chicot county.

Boll Weevil Activity Up

In almost every section of the Cotton Belt where boll weevils are known there has been a decided increase in the pest. Rains throughout most of the area have provided succulent cotton growth and ideal conditions for boll weevil increase. In many sections control was difficult because of rank growth and continued rain.

In Texas heavy infestations were reported during early August from the southwest, south central, east, central, north central and northeast areas of the state. Six treated fields checked in McLennan and Falls counties averaged 45 per cent punctured squares while five untreated fields averaged 80 per cent.

The highest infestation counts in Louisiana came from the Tallulah area where three fields had over 50 per cent square infestation. The average of the 118 fields examined was 19 per cent. There was a noticeable boll weevil increase in Oklahoma, Arkansas and Tennessee.

In the Stoneville area of Mississippi, fields examined ranged from 1-100 per cent infestation with an average of 32 per cent. Populations, if not controlled, were high enough to destroy most of the fruit. Fifty fields in eight western Alabama counties averaged 23 per cent infestation. In 80 treated fields in northern Georgia the infestation averaged nine per cent, a sharp increase over the previous report.

Counts in 43 treated fields in Darlington county, S. C., averaged 74 per cent square infestation. Four treated fields in Florence county averaged 57 per cent while four untreated fields averaged 97 per cent. Of 143 treated fields checked in North Carolina 138 were found to be infested with boll weevil. All counties reporting except Johnston and Northampton had over 10 per cent of bolls punctured with the highest infestation being 75 per cent in Scotland county. Untreated fields inspected ranged from 14-100 per cent boll infestation.

Virginia also reported square infestation with inspected fields showing 20 per cent in Southampton county, 11 per cent in Greensville and 7 per cent in Brunswick.

Cotton Bollworms

Bollworms were also of primary concern to cotton growers in several states. These insects were the major cotton pests in Pinal and Pima counties, Ariz., and were on the increase in Maricopa. Control was necessary in many fields. Infestations were very heavy in Chaves county, N. M., and occurred in other cotton growing regions. Texas reported the insect to be heavy in succulent cotton over the state. Bryan county, Okla., had the heaviest outbreak since 1950. The insect was also on the increase in California and Arkansas.

Spider mites were on the increase in Texas, Arkansas and North Carolina.

Fruit Insects

Of the fruit insects, codling moths and spider mites appeared to cause the most concern during late July and early August. The codling moth was on the increase in Rockland county, New York. New Jersey and Indiana were expecting more than the ordinary number of entries. Mites were on the increase in areas of New Mexico, Illinois, New York, New Jersey and Maryland.

Screw Worms

Screw worms in late July were reported to be heavier than normal over the entire state of Texas. Several cases were reported from Louisiana, and in early August cases were reported from the Ottumwa and Fort Dodge, Ia., areas. ▲

FERTILIZER MATERIALS MARKET

New York

August 12, 1955

Sulfate of Ammonia. Domestic shipments are rather slow at present and some of the larger producers are looking hopefully to the export market to relieve present storage problems. A number of large inquiries are in the market for Korea and India.

Urea. Domestic producers reduced prices recently to $100 per ton, f.o.b. plants, and in some cases to $105 per ton delivered eastern points.

Nitrogenous Tankage. Material was available at most points for prompt shipment as some buyers withheld their orders as they wanted to get a better idea of how much business they would do this Fall. Prices still range from $4.10 to $5.10 ($4.98 to $6.20 per unit N), according to shipping point.

Castor Pomace. Some material was sold for September shipment at $40 per ton, f.o.b. domestic production point, which represents an advance of $2.50 per ton over last sales. Some plants are shut down and others producing on a limited scale with the result little castor pomace is available.

Organics. Organic fertilizer materials showed a mixed tendency the past week as buyers for the most part remained out of the market. Last sales of tankage and blood were made at from $5 to $5.75 per unit of ammonia ($6.08 to $6.99 per unit N), according to quality f.o.b. shipping points. Feed buyers were not showing too much interest at present. Soybean meal was quoted at $51 per ton, f.o.b. Decatur, Ill., for immediate shipment and several dollars per ton cheaper for new crop material for later delivery. Cottonseed meal was steady at about $61 per ton, f.o.b. Memphis, Tenn.

Fish Meal. Fish meal was in a firm position because of the limited catch in northern waters. Further south, good fishing was reported but prices remained firm with last sales of menhaden fish scrap being made at $125 per ton, f.o.b. fish factories and the fish meal at several dollars per ton higher. Some small lots of imported fish meal recently arrived.

Bone Meal. The market was steady at $65 per ton for both fertilizer and feed grades. Little imported material was being offered at the present time.

Hoof Meal. Last sales made on the basis of $6 per unit of ammonia ($7.29 per unit N), f.o.b. Chicago.

Superphosphate. At this writing, two of the smaller producers of phosphate rock had signed up with the Union in Florida but six larger producers still decided to hold out, with the result that little phosphate rock was moving. While no great shortage has developed as yet on superphosphate, if the strike continues, shortages at different points are bound to develop.

Potash. Producers were keeping after buyers to carry out contracts and obtain instructions for nearby shipments. Very little activity developed in foreign potash with offerings limited.

Philadelphia

August 12, 1955

Materials in general are quiet with ample stocks to supply any demand. Movement of blood, tankage and bone is rather dull. Phosphate rock prices are reported slightly advanced due to increased production costs. The Florida rock strike is still on.

Sulfate of Ammonia. Demand is slack and production active, with inventories building up. The market is quoted at $40 to $42 per ton in bulk. There is considerable export interest.

Nitrate of Ammonia. Market is seasonally dull, with production heavy, and a suggestion of price discount for early deliveries.

Blood, Tankage, Bone. Blood and tankage are moving slowly at $5.00 to $5.50 per unit of ammonia ($6.08 to $6.68 per unit N). Bone meal is in fairly good supply at $65 per ton for 1 per cent nitrogen and 60 per cent bone phosphate grade; and 3 per cent ammonia and 50 per cent bone phosphate grade at $60 per ton.

Fish Scrap. This has picked up a little and the catch is said also to have improved. Present quotations are $129 per ton for scrap, and $133 per ton for menhaden meal.

Phosphate Rock. Prices have been advanced slightly on all grades due to increased production costs. The strike in Florida continues, but it is felt that there is sufficient rock on hand to last well through this month.

Superphosphate. Both normal and triple grades are reported in good supply despite the strike in Florida. However, it is agreed that if the strike continues through September the situation may become very serious.

Potash. Practically no demand is reported at this time and supplies are plentiful. Production has been considerably ahead of last year. No recent price changes have been published.

by Dr. Melvin Nord

PATENT REVIEWS

Vertical Den for Continuous Superphosphate Solidification

US 2,709,640, issued May 31, 1955 to Ira M. Le Baron and assigned to International Minerals & Chemical corp., relates to the continuous production and curing of superphosphate.

It is extremely difficult to produce a uniform superphosphate product by the use of a noncontinuous den for curing. Either the last material is insufficiently cured, or the first material added is likely to set up into a hard mass. This difficulty is avoided by the use of a continuous den for curing.

As shown in Fig. 1, the sides (1 and 2) of the den have endless belts (5 and 6) so arranged that the discharging end (3) is larger in perimeter than the charging end (4). Cleats (11) are attached to the belts; these may be made of wood, rubber, etc. A belt conveyer (21), positioned below the den, removes the cured material.

As long as the acid-phosphate rock mixture is added at the top, a hardened material will be discharged from the bottom.

Actual data illustrating the results achieved with this process and apparatus are given.

Process for Producing High-grade Phosphate Fertilizer

US 2,709,649, issued May 31, 1955 to Ira M. Le Baron and

Figure 1

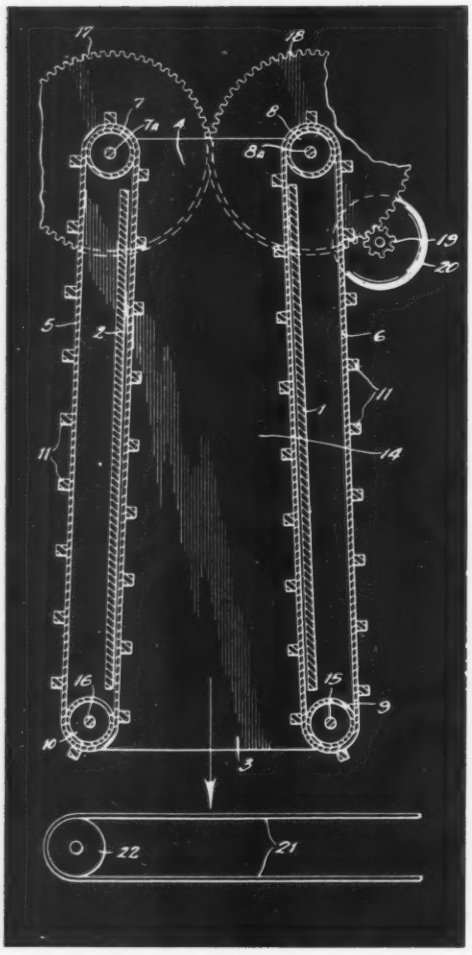
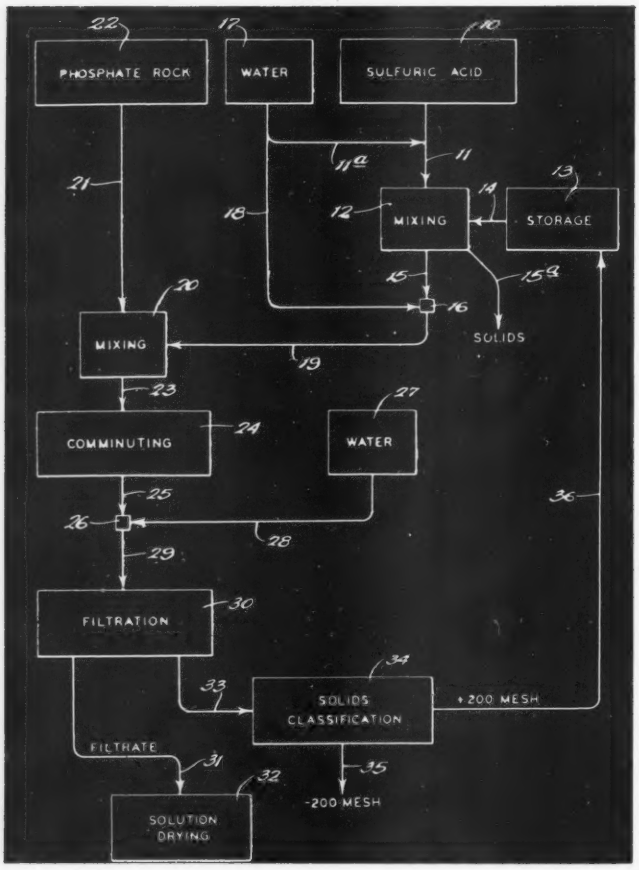


Figure 2



assigned to International Minerals & Chemical corp., describes a process for producing high-concentration phosphates.

The process is shown in the flowsheet, Fig. 2. Sulfuric acid (which may be diluted with water through line 11a) is admitted to a mixer (12), together with recycled particles of +200 mesh from a previous leaching operation (from storage 13). Solids which do not dissolve here are discarded. The decanted liquid is diluted at mixer (16) to proper acid concentration, then contacts fresh phosphate rock in mixer (20). The acid mix is then further comminuted (at 24), mixed with water to form a slurry containing 30 per cent solids and is filtered (at 30). The filtrate contains soluble monocalcium phosphate, which is dried (at 32), and filter cake is classified (at 34). The −200 mesh particles are assumed to be completely insoluble, and are discharged. Larger particles are recirculated for further treatment with more concentrated acid.

According to the inventor, less concentrated H_2SO_4 is used than in the superphosphate process, with smaller amounts of excess acid. At the same time, a higher recovery of water-soluble phosphates is also obtained.

Examples cited show recoveries of 88 to 98 per cent of P_2O_5 present in the phosphate rock.

Treatment of Phosphate Rock

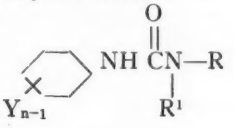
US 2,710,247, issued June 7, 1955 to Chester L. Knowles and Roman Chelminski, assigned to Knowles Associates, describes a process for treating phosphate rock with sulfuric acid to produce phosphoric acid in high concentration without evaporation.

A novel feature of the process is that the reaction mixture contains a recycle suspension of fine seed crystals, from which coarser crystals have been removed.

Herbicidal Composition

US 2,709,648, issued May 31, 1955 to Truman C. Ryker and Dale E. Wolf, assigned to E.I. du Pont de Nemours & co., discloses mixtures of a herbicidal aryl alkyl urea compound with another herbicidally active compound. According to the inventors, a synergistic (i.e. greater-than-additive) effect is obtained.

The urea compound is represented by the formula



where Y is halogen, nitro, alkyl, or alkoxy, n is 1-4, R is an alkyl, and R^1 is hydrogen or alkyl (1-6 carbon atoms in each alkyl or alkoxy group).

The patent lists a large number of compounds of this type, as well as a number of substances which can serve as the second ingredient. ▲

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Statistics

Record Deliveries of Potash in '54-55

A new record of 2,164,997 tons K_2O was delivered in North America by member companies of the American Potash Institute and the importers, an increase of 8 per cent over 1953-54.

For agricultural uses, deliveries and per cent change from the previous year included: continental U.S., 1,897,404 tons K_2O, up over six per cent; Canada, 86,881 tons, up 20; Cuba, 5,264 tons, down 21; Puerto Rico, 22,328 tons, up seven; Hawaii, 191,218 tons, up two; and other countries, 30,584 tons, up 731.

Illinois lead the 46 states receiving deliveries, followed in order by Ohio, Indiana, Georgia, Virginia and Florida.

Muriate of potash comprised 93 per cent of the total with sulfate of potash and sulfate of potash-magnesia accounting for the remainder. Manure salts reached an insignificant figure.

During the first six months of 1955, with imports for five months, deliveries amounted to 2,056,052 tons of salts containing a K_2O equivalent of 1,213,430 tons, an increase of seven and eight per cent, respectively, over the same 1954 period.

May Super Output, Shipments Over '54

Production during May of 210,311 short tons of superphosphate (100 per cent APA) was a decrease of 10 per cent from the revised April figure but was 12 per cent over May, 1954.

Shipments of all grades totaled 108,283 tons, a decrease of 43 per cent from the previous month and 9 per cent over May, 1954. Stocks on hand at the end of May were 11 per cent more than those held on May 1 and 20 per cent over May 31, 1954.

Coke-Oven Ammonia Output Down in 1954

During 1954 a decline in coke-oven operations reduced output of ammonia and ammonia products by 15 and 13 per cent, respectively, according to the Bureau of Mines. A total of 80 active plants produced 1,774,464,664 pounds of sulfate equivalent, 1,645,636,400 pounds as sulfate.

Sales as sulfate for the year totaled 1,638,967,393 pounds valued at $34,644,877 and, as liquid, 19,596,259 pounds (NH_3 content) with a value of $1,066,242. On hand at the end of 1954 were 312,592,422 pounds of sulfate and 3,069,361 pounds (NH_3 content) of liquid.

NH_3 Record in May

Another new high in synthetic anhydrous ammonia production was reached in May with output reported by the Bureau of the Census at 296,799 tons, 10,232 tons higher than in April.

Production — May, 1955

Compiled from Government Sources

Chemical	Unit	May 1955	May 1954	April 1955
Ammonia, synth. anhydrous	s. tons	[1]296,799	249,837	*286,567
Ammonia liquor, coal & coke (NH_3 content)	pounds	3,431,667	3,170,496	3,117,544
Ammonium nitrate, fert. grade (100% NH_4NO_3)	s. tons	135,265	129,259	148,259
Ammonium sulfate				
synthetic (technical)	s. tons	104,138	75,910	90,042
coke oven by-product	pounds	171,251,310	132,412,571	164,133,847
BHC (Hexachlorocyclohexane)	pounds	5,013,168	9,265,656	4,474,399
Gamma content	pounds	977,818	1,459,527	889,625
Copper sulfate (gross)	s. tons	7,340	6,116	6,496
DDT	pounds	10,703,051	9,574,147	9,216,134
2,4-D Acid	pounds	2,881,463	3,087,898	3,142,302
esters and salts	pounds	3,572,790	2,243,165	*3,075,128
esters and salts (acid equiv.)	pounds	2,744,981	1,749,045	*2,262,056
Lead arsenate (acid & basic)	s. tons	406	1,055	1,157
Phosphoric acid (50% H_3PO_4)	s. tons	306,851	263,086	*311,551
Sulfur, Native (Frasch)	l. tons	455,508	465,360	437,738
Recovered	l. tons	35,800	31,000	33,700
Sulfuric acid, gross (100% H_2SO_4)	s. tons	1,372,743	1,178,073	1,339,115
Chamber Process (100% H_2SO_4)	s. tons	183,351	214,570	198,247
Contact Process (100% H_2SO_4)	s. tons	1,189,392	963,503	1,140,868
Superphosphate (100% APA)	s. tons	210,311	187,310	*233,572
Normal (100% APA)	s. tons	132,053	139,760	158,451
Enriched (100% APA)	s. tons	3,999	—	5,582
Concentrated (100% APA)	s. tons	72,518	47,182	*68,561
Wet Base (100% APA)	s. tons	437	368	1,319
2,4,5-T Acid	pounds	377,406	—	190,870
TEPP	pounds	56,527	—	—

* Revised. [1] Includes quantities for 1 plant previously not reporting.

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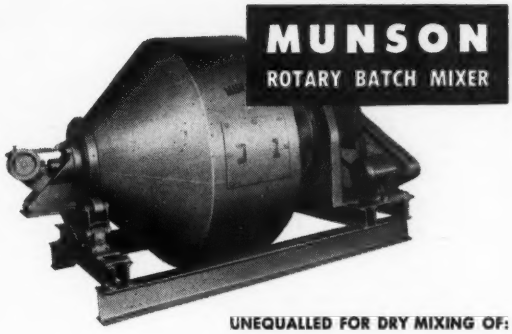

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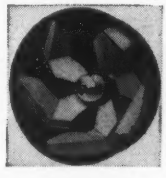

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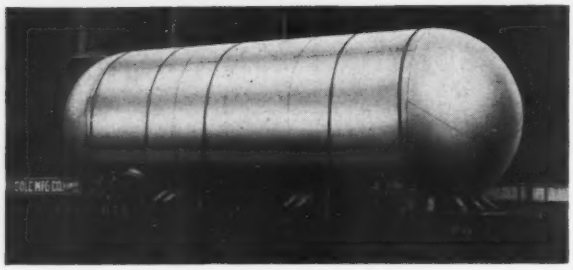

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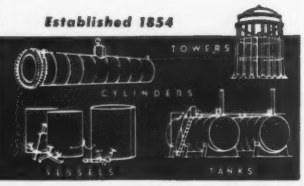

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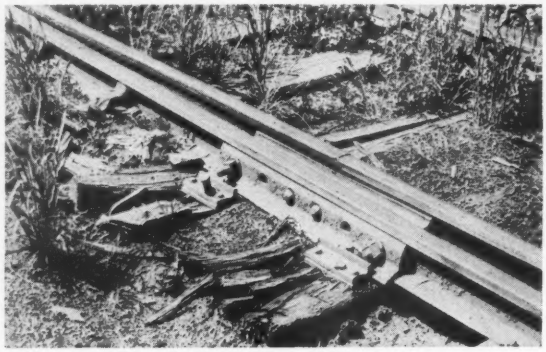
Watch Your Track

Specialists of the L. B. Foster company point out the importance of properly maintaining in-plant rail facilities—one of the most neglected phases of maintenance operations. These Foster photos show a few of the many poor track conditions that can lead to trouble. ▲



An entire track system could be endangered by this switchheel block. Note the general deterioration of ties, missing and loose bolts. Keep the area between the rail and switch clear of mud and debris.

Poor drainage probably caused rotting and splitting of completely deteriorated tie. Its weakened condition resulted in general track deterioration.

Note battering of rail ends at the joint in this completely deteriorated track structure. Loose bolts and rain expansion cause excessive wear.

A general lack of maintenance is reflected by this badly worn frog. The clutter of debris and pebbles and loose bolts could prevent proper functioning.

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editorial

A Bright Future

A BRIGHT future for the fertilizer industry both at home and abroad was pictured by J. Albert Woods, president of Commercial Solvents corporation, in his address before the recent annual meeting of the Northeastern Branch, American Society of Agronomy.

His comments on the expansion of present and potential markets are worthy of careful consideration and, in this editorial, we quote liberally from his material.

Woods predicted that use of plant foods will continue to rise at the rate of about six per cent annually and that, by 1970, world consumption will double the amount used this year. The industry, he stressed, must think of the world as its market in view of the world wide shortage of foods and the conditions of the domestic plant foods market, especially in nitrogen.

CONSIDERING the problem of food and plant food surpluses, Woods said that there is a great need for vastly increased quantities of plant food both at home and abroad. In this, U.S. fertilizer consumption is low compared with some other areas of the world where large quantities are necessary to feed the peoples. This country is moving in that direction.

It is a fact, continued Woods, that this year the industry is producing more plant food, nitrogen in particular, than the farmer is consuming. The farmer must be sold, he emphasized, and, if anything, he is more skeptical and offers more sales resistance than the average buyer group.

We must, said Woods, "face the fact that we in the plant foods business have entered upon the most competitive, and therefore the most interesting and promising period in our history."

The nitrogen surplus and farm surplus, he added, are relatively minor problems in view of the large market potential—if the industry continues to effectively create new and better plant food markets, open new markets and enlarge existing ones.

Working in the industry's favor is a rapid population growth, the necessity of maintaining national strength and the desire to maintain a high standard of living.

Reminding his listeners that a well fed world is the best basis for a free world, the CSC head added that it is "sheer folly" to make the United States the world's bread basket. It is more reasonable for the industry to "marshall our research, our production and our ability to sell good and useful plant foods in a broad and long term effort which will help the world to adequately feed itself."

He pointed to the similarity between domestic and overseas problems—more than adequate supplies of plant foods versus a steadily expanding population coupled with the universal desire to live on the American standard.

"The only real significance of these figures," he continued, "is the accusing finger they point to the world wide lack of knowledge of the importance to peace and universal prosperity of plant foods. . . .

"Better understanding of the use and value of plant foods, and the role they play in raising the yield per acre, is the essence of developing conditions in the world market for the profitable distribution of plant foods made in America.

"In this effort we must prepare to meet the widely varied needs of the world's farmers with products that not only are useful but are within their economic reach. Lower cost production of higher analysis fertilizer is, of course, a part of the answer. But equally important is recognition of the types of formulations of plant foods required by farmers in the three major farming groups found in the world today."

THE GROUPS listed by Woods included countries with irrigated and flooded crops using much more nitrogen than phosphorus, dry land farmers in temperate climates using one or two units of nitrogen for each unit of phosphorus and countries with large areas in pasture or with extensive dry areas using mainly phosphorus.

Heavy use of mixed plant foods is sound, he continued, where large areas, with high labor costs, must be fertilized, but where farms are smaller and much plant food is applied by hand at low labor cost, separate applications of N, P and K may be the most efficient way.

We must avoid waiting for favorable trends to enhance our business and recognize the "challenge of greater production of still better products at lower costs." Emphasis must be placed, urged Woods, on expansion of existing markets and opening of new ones throughout the world rather than wasting "all of our precious time scrapping over existing ones."

"I firmly believe that we have it within our power," he concluded, "to clearly focus our total effort upon meeting this requirement and that we will do just that in the years ahead."

G. P. T., JR.
Editor

Buyers' Guide

Classified Index to Advertisers in 'Farm Chemicals'

ALDRIN
Ashcraft-Wilkinson Co., Atlanta, Ga.
Shell Chemical Co., Agr. Chem. Div., Denver, Colo.

AMMONIA—Anhydrous and Liquor
Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
Escambia Bay Chem. Corp., Pensacola, Fla.
Grand River Chem. Div., Deere & Co., Tulsa, Okla.
Lion Oil Co., El Dorado, Ark.
Mississippi River Chem. Co., St. Louis, Mo.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
U. S. Industrial Chemicals, New York City

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J. C. Carlile, Corp., Denver, Colo.

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Phillips Chemical Co., Bartlesville, Okla.

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Monsanto Chem. Co., St. Louis, Mo.

AMMONIUM SULFATE
See Sulfate of Ammonia

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Chase Bag Co., Chicago, Ill.

BAGS—COTTON
Chase Bag Co., Chicago, Ill.

APPLICATORS—Ammonia
KBH Corp., Clarksdale, Miss.

APPLICATORS—Liquid Fertilizer
Krause Plow Corp., Hutchinson, Kan.

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American Agricultural Chemical Co., N. Y. C.

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McIver & Son, Alex. M., Charleston, S. C.

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Ashcraft-Wilkinson Co., Atlanta, Ga.

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Ashcraft-Wilkinson Co., Atlanta, Ga.

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National Lime & Stone Co., Findlay, Ohio

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Tennessee Corp., Atlanta, Ga.

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Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa

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Ashcraft-Wilkinson Co., Atlanta, Ga.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

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Raw Materials Trading Co., New York City

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Stephens-Adamson Mfg. Co., Aurora, Ill.

ENDRIN
Shell Chemical Co., Agr. Chem. Div., Denver, Colo.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

FERTILIZER—Liquid
Clover Chemical Co., Pittsburgh, Pa.

FERTILIZER—Mixed
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.

FERTILIZER—Organic
Lebanon Chemical Corp., Lebanon, Pa.

FILLERS
Bradley & Baker, N. Y. C.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
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FULLER'S EARTH
Ashcraft-Wilkinson Co., Atlanta, Ga.

FUNGICIDES
American Agricultural Chemical Co., N. Y. C.
Berkshire Chemicals, New York City
Metalsalts Corp., Hawthorne, N. J.
Tennessee Corp., Atlanta, Ga.

HERBICIDES
American Potash & Chemical Corp., Los Angeles, California
Barco Chemicals, Inc., Des Moines, Ia.
Lion Oil Company, El Dorado, Ark.

HERBICIDES—Oils
Lion Oil Company, El Dorado, Ark.

HOPPERS & SPOUTS
Stedman Foundry and Machine Co., Aurora, Ind,
Sturtevant Mill Co., Boston, Mass.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Berkshire Chemicals, New York City
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INSECTICIDES
American Agricultural Chemical Co., N. Y. C.
American Potash & Chemical Corp., Los Angeles, California
Ashcraft-Wilkinson Co., Atlanta, Ga.
Barco Chemicals, Inc., Des Moines, Ia.
Berkshire Chemicals, New York City
Fairfield Chem. Div., Food Mach. & Chem. Corp., New York City
Pennsylvanna Salt Mfg. Co., of Wash, Tacoma, Wash.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

IRON SULFATE
Tennessee Corp., Atlanta, Ga.

KAOLIN
Thomas Alabama Kaolin Co., Baltimore, Md.

LEAD ARSENATE
American Agricultural Chemical Co., N. Y. C.

LIMESTONE
American Agricultural Chemical Co., N. Y. C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
National Lime & Stone Co., Findlay, Ohio

MACHINERY—Acid Making and Handling
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
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Sturtevant Mill Co., Boston, Mass.

MACHINERY—Acidulating
Chemical Construction Corp., New York City
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Grinding and Pulverizing
Bradley Pulverizer Co., Allentown, Pa.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

Buyers' Guide

MACHINERY—Material Handling
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Hough, The Frank G. Co., Libertyville, Ill.
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Stedman Foundry and Machine Co., Aurora, Ind.
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Sturtevant Mill Co., Boston, Mass.

MACHINERY—Mixing and Blending
Munson Mill Mach. Co., Utica, N. Y.
Pousen Co., Los Angeles, Calif.
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MACHINERY—Mixing, Screening and Bagging
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
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MACHINERY—Power Transmission
Link-Belt Co., Chicago, Ill.
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MACHINERY Superphosphate Manufacturing
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Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MAGNESIUM SULFATE
Berkshire Chemicals, New York City

MANGANESE SULFATE
Tennessee Corp., Atlanta, Ga.

MANURE SALTS
Potash Co. of America, Washington, D. C.

MINOR ELEMENTS
Tennessee Corporation, Atlanta, Ga.

MIXERS
Munson Mill Mach. Co., Utica, N. Y.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

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Berkshire Chemicals, New York City

NITRATE OF SODA
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Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
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McIver & Son, Alex. M., Charleston, S. C.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
International Min. & Chem. Corp., Chicago, Ill.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NITROGEN SOLUTIONS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
Escambia Bay Chem. Corp., Pensacola, Fla.
Mississippi River Chem. Co., St. Louis, Mo.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Lion Oil Company, El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.

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American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Smith Rowland Co., Norfolk, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

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Monarch Mfg. Works, Philadelphia, Pa.
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McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

PHOSPHORIC ACID
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International Min. & Chem. Corp., Chicago, Ill.
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Potash Co. of America, Washington, D. C.
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United States Potash Co., N. Y. C.

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Potash Co. of America, Washington, D. C.

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PYROPHYLLITE
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Broadway Rubber Corp., Louisville, Ky.
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SULFATE OF AMMONIA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Lion Oil Co., El Dorado, Ark.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA
International Min. & Chem. Corp., Chicago, Ill.

SULFUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Texas Gulf Sulphur Co., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying
Ashcraft-Wilkinson Co., Atlanta, Ga.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

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American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

SUPERPHOSPHATE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC
Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Smith-Rowland Co., Norfolk, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

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VALVES
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The United States

To all to whom these Presents shall come. Greeting.

Whereas Samuel Hopkins of the City of Philadelphia and State of Pennsylvania hath discovered an Improvement, not known or used before such Discovery, in the making of Pot ash and Pearl ash by a new Apparatus and Process, that is to say, in the making of Pearl ash 1st by burning the raw Ashes in a Furnace, 2d by dissolving and boiling them when so burnt in Water, 3d by drawing off and settling the ley, and 4th by boiling the ley into Salts which then are the true Pearl ash; and also in the making of Pot ash by fluxing the Pearl ash so made as aforesaid, which Operation of burning the raw Ashes in a Furnace, preparatory to their Dissolution and boiling in Water, is new, leaves little Residuum; and produces a much greater Quantity of Salt: These are therefore in pursuance of the Act, intituled "An Act to promote the Progress of useful Arts" to grant to the said Samuel Hopkins, his Heirs, Administrators and Assigns, for the Term of fourteen Years, the sole and exclusive Right and Liberty of using and vending to others the said Discovery, of burning the raw Ashes previous to their being dissolved and boiled in Water, according to the true Intent and Meaning of the Act aforesaid. In Testimony whereof I have caused these Letters to be made patent, and the Seal of the United States to be hereunto affixed. Given under my Hand at the City of New York this thirty first Day of July in the Year of our Lord one thousand seven hundred & Ninety.

G. Washington

City of New York July 31st 1790.

I do hereby certify that the forgoing Letters patent were delivered to me in pursuance of the Act, intituled "An Act to promote the Progress of useful Arts", that I have examined the same, and find them conformable to the said Act.

Edm Randolph Attorney General for the United States.

(Endorsement on back of grant)

Delivered to the within named Samuel Hopkins this fourth day of August 1790

Th Jefferson

First United States Patent Grant
July 31, 1790
(Reproduced from the original in the collection of the Chicago Historical Society)

The First United States Patent . . .

was for potash

This is a reproduction, slightly reduced, of the first United States patent ever issued. It was granted in 1790 to Samuel Hopkins of Philadelphia, for a process for producing potash.

P.C.A.
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RED MURIATE

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